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ECONOMIC LAW ENFORCEMENT

VOLUME III

STRENGTHENING ENVIRONMENTAL LAW ENFORCEMENT: WATER POLLUTION

The Judges, (detail American woodcut, 19th Century).

CONNECTICUT ENFORCEMENT PROJECT
U. S. ENVIRONMENTAL PROTECTION AGENCY
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ECONOMIC LAW ENFORCEMENT

VOLUME III

STRENGTHENING ENVIRONMENTAL LAW ENFORCEMENT: WATER POLLUTION

Final Report Submitted Under Contract #M00103910

by: The Connecticut Enforcement Project
Department of Environmental Protection
Hartford, Connecticut 06115

to: The U.S. Environmental Protection Agency
Region I
Boston, Massachusetts 02203

September 1975

The Judges (detail)
John Andrew and Son (after W. H. Drake)
American, 19th Century
Wood engraving
Courtesy Museum of Fine Arts, Boston, Ma.

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PART I

USING ECONOMIC CIVIL ASSESSMENTS

CHAPTER I

USING ECONOMIC CIVIL ASSESSMENTS TO STOP ILLEGAL DISCHARGES AND TO ENFORCE WATER POLLUTION ABATEMENT ORDERS

Sections 502 and 503 of the Civil Penalties Regulations are designed to improve the Department's enforcement capabilities concerning the two main instruments of its water pollution control program: abatement orders and permits. Section 503 is primarily aimed at the enforcement of order timetables. It can also be applied to a limited class of cases in which certain requirements of permits are blatantly violated. Section 502 is primarily designed to enforce the requirement that persons wishing to start new discharges must obtain permits before doing so. It can also be used in certain ways to facilitate the administration of Section 503 cases.

The purposes of the two regulations are different, but their basic enforcement approach and most of their provisions are identical. Both regulations will enable the Department to levy civil assessments without first going to court. These assessments will be large enough to eliminate the economic benefit of noncompliance with the pollution control requirement to which they are directed (order timetables and mandatory permits). The economic benefits in both types of cases are generally the same: delaying or avoiding expenditures for the equipment and the operating and maintenance activities necessary to limit pollution as required by law. Both regulations provide the same methodology for calculating assessments that will just wipe out these benefits and thus eliminate the economic incentive for noncompliance.

THE PRE-CIVIL ASSESSMENT ENFORCEMENT PROGRAM

This section discusses the Water Compliance Unit's order and permit systems, the pollution standards it uses, the enforcement tools it had prior to passage of the Enforcement Act and the effectiveness of those tools.

Orders and Permits

The Department's basic water pollution control authority, the Clean Water Act of 1967 (Chapter 474(a) of the Connecticut General Statutes), originally established two distinct approaches to controlling water pollution: orders and permits.

The Department was authorized to issue legally binding orders requiring existing pollutors to take specific steps by specific deadlines to clean up their discharges. Sections 25-54(g) and (h) provide for abatement orders for pre-Act (pre-1967) municipal and non-municipal discharges; Section 25-54(j) authorizes orders for any discharger under a permit or a previous order where existing treatment systems no longer adequately control pollution; and Section 25-54(k) provides for orders for discharges that are not sources of pollution at present, but will be in the future if control steps are not taken. Regulatees under order are allowed to continue their discharges while coming into compliance.

All dischargers, whether polluters or not, that might begin discharging after the Act went into effect (May 1, 1967, except for municipalities for which the operative date is April 10, 1973) must obtain Department permission before commencing their discharges. If the discharge would be a source of pollution, the Department will not grant this permission until an approved treatment facility is installed and operational. It is illegal to start a post-Act discharge without a permit.

The basis for the pre-/post-Act distinction appears to be the difference in notice between the pre- and post-Act dischargers. The post-Act discharger should know that it is illegal to pollute and that the Department regulates discharges and therefore can fairly expect the discharger to provide for waste treatment, if necessary before it begins to discharge. The pre-Act discharger, the discharger under permit or in compliance with an order, and the discharger that is not presently a source of pollution has or had reason to believe its discharge is or was legal. It would be unfair to require such a person to stop discharging pending installation or updating of treatment system.

However, the distinction in the way in which these two types of cases can be handled has recently been greatly reduced. In part this change reflects the fact that, after several years of vigorous activity by the Water Compliance Unit, few dischargers could reasonably claim not to have had some notice of pollution control requirements. It also reflects several practical factors. The Clean Water Act required the Department to seek a court injunction whenever a discharge was initiated without a permit. It could not issue an order, which would allow the discharge to continue while control facilities were installed. However, because the Department could not get court injunctions, the law was changed in 1973 to make seeking an injunction optional and to allow the Department to issue orders in such cases. Further, to make the Department eligible to administer the National Pollutant Discharge Elimination System in Connecticut, the Legislature further amended the Clean Water Act to allow the Department to issue permits to pre-1967 dischargers.

Thus, both pre- and post- Clean Water Act dischargers now can be issued both orders and permits. The Department is, however, reluctant to issue orders to those who have started a discharge illegally, and permits issued to pre-1967 dischargers put the regulatee under no obligation to renew as a condition of continued operation. The ability to impose Section 502 assessments on those who discharge without permits may make the Department less reluctant to use orders in such cases. However, a statutory amendment is probably needed to make permit renewal for pre-1967 discharges clearly an obligation. Once such an obligation is clearly established, the Department will be able to use Section 502 in such cases.

Standards

The Department does not have a set of clear, predictable standards that define what discharges require treatment (or what type or intensity of treatment). It must review each discharger's specific problem before these decisions can be made. Dischargers face nothing analogous to the emissions standards that put sources of air pollution on notice that they have a duty to clean up. So far no standards have been developed, at either the State or Federal level, that would provide similar advance notice and that would be practically enforceable. The Unit feels that no standards can be developed given the state of current technology and the enormous diversity of processes that must be controlled.

Both the Unit's requirement that those responsible for new discharges obtain prior approval for the discharge (the permit) and its power to issue orders to dischargers recognizes this need for case by case decision-making. Its approach to enforcement must be based on a similar understanding.

Connecticut's Clean Water Act sets only general standards to guide the Department in controlling pollution. It authorizes the Department to issue orders to "prevent the continuance of pollution" (Section 25-27), "to abate pollution" (Section 25-54(g), (h), (j), and also authorizes the Department to require installation of treatment facilities that will "protect the waters of the State from pollution" prior to issuance of permits if proposed discharges would "cause pollution" (Section 25-54(i)). The operative word in each case is "pollution". That term is defined broadly and in general terms that provide no specific measurable standard for administrative guidance (Section 25-54(b)).*

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* In Section 25-54(b), the term is defined as follows:

"Pollution" means harmful thermal effect or the contamination or rendering unclean or impure or prejudicial to public health of any waters of the state by reason of any wastes or other material discharged or deposited therein by any public or private sewer or otherwise so as directly or indirectly to come in contact with any waters;

"harmful thermal effect" means any significant change in the temperature of any waters resulting from a discharge therein, the magnitude of which temperature change does or is likely to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life;

"rendering unclean or impure" means any alteration of the physical, chemical or biological properties of any of the waters of the state, including, but not limited to, change in odor, color, turbity or taste;

(footnote continued on following page)

The statute does set out a somewhat more concrete standard for hearing officers to use in deciding challenges to orders and permit denials. Section 25-54(o) requires hearing officers to consider, among other unspecified facts, the technological feasibility of the proposed system. In the one court case in which these issues were involved* the court held that the consideration of facts other than technological feasibility was within the hearing officer's discretion. Thus, the only time the Water Compliance Unit is held to specific standards is at hearing challenges and the only standard it is held to then is that of technological feasibility.

No one has yet developed adequate, practically enforceable standards for water pollution abatement. Standards for reduction of pollutant concentrations are difficult to devise because there are at least seven variables to consider: the concentration of pollutants in the discharge; the flow (e.g. gallons per hour) of the discharge; the duration of the discharge over various periods of time (e.g. hours per day); the discharger's product volume (e.g. the number of tons of metal processed); the condition of the receiving body of water; and how difficult and expensive alternative treatments would be.

It is essential to have a measure of the quantity of pollutants discharged over time (the first three variables). This information can be difficult to get because flow often is extremely variable and therefore time-consuming and costly to measure.

Finding a standard that defines how much of what is discharged is allowable is even more difficult. EPA, required by Congress to develop effluent standards for its water pollution programs, has published a series of industry effluent guidelines linking the volume of each type of pollutant that firms in an industry may discharge to that firm's product volume. This standard takes into account what is technologically feasible in an industry and avoids the difficult enforcement problems posed by variations in the volume of water in which the pollutants are carried from the facility.

(footnote continued from preceeding page)

"wastes" means sewage or any substance, liquid, gaseous, solid or radioactive, which may pollute or tend to pollute any of the waters of the state;

"sewage" means human and animal excretions and all domestic and such manufacturing wastes as may tend to be detrimental to the public health;

"waters" means all tidal waters, harbors, estuaries, rivers, brooks, watercourses, waterways, wells, springs, lakes, ponds, marshes, drainage systems, and all other surface or underground streams, bodies or accumulations of water, natural or artificial, public or private, which are contained within, flow through or border upon this state or any portion thereof.

* Ronson v. Water Resources Commission, Superior Court Docket No. 15

However, no enforcement program can rest on this standard. Administrators will never be able to disprove (and the legal burden is on them to do so) claims regulatees make about their product volume. How is the Department, for example, going to be able to prove that a metal plater who plates irregularly shaped objects has really only plated 60,000 square meters of metal goods, not the 120,000 the company claims?* If it cannot, the regulatee will be able to discharge twice the volume of pollutants the standard allows.

Although the Department's Water Compliance Unit feels that water pollution control problems are too diverse even within classes of dischargers, to allow the use of fixed standards, it uses a set of informal discharge standards to evaluate the treatment proposals submitted by order recipients and permit applicants. These standards typically define the weight of various pollutants allowed per liter of discharge. They are set assuming that the flow of water has been reduced equally in all similar cases. (This is by no means a safe assumption.) In some cases they specify the type of treatment required. They are meant to require the lowest levels of discharge pollutant content possible with the best technologically feasible and widely applicable treatment.

These standards are not published; the engineers merely keep a list of them at their desks. They exist only for relatively common types of sources, but for these cases they serve as a useful starting point in establishing treatment requirements.

Useful though they are, these informal standards cannot wisely be turned into enforceable performance standards for industry. Many firms would not be covered. Variations in flow are handled only with the assumption that the engineer will lower flow as much as is reasonable for the facility in question - leaving the distinct possibility that like companies will have different flows and therefore different levels of pollutant concentration in their discharges. In any case, the Unit wants to retain the case-by-case flexibility it now has to respond to differences in the regulatee's facilities, developments in control technology, and other factors such as the regulatee's economics and the degree of danger posed by the specific pollutants being discharged. The Unit feels it would lose this flexibility if it formalized its private, informal guidelines.

Without a clear effluent standard, the Department's approach to water pollution control has of necessity had to be case by case decision-making. It is this permit and order-based regulatory structure that Sections 502 and 503 are designed to strengthen.

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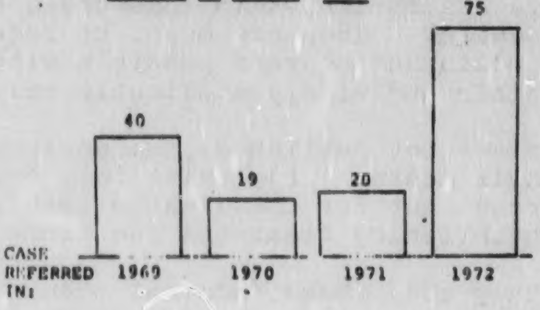
* Connecticut has not been eager to base its enforcement efforts on this standard for another reason: Connecticut's ad hoc, "whatever is technically possible" standard varies a great deal from the Federal guidelines; Connecticut's standards in actual cases have been anything from several thousand percent tougher to 72 percent less stringent than the Federal standard.

Enforcement

The Department has had trouble enforcing prompt compliance in cases in which dischargers choose to be uncooperative. Neither of its existing enforcement options, going to court and persuasion, work very well. Going to court is slow and expensive. Moreover - largely because the injunction remedy is so severe (plant closings mean unemployment and great economic losses) - it very rarely gives the Department an effective remedy. Fully three-quarters of all cases referred to the Attorney General* to obtain court relief in 1972 were still there in August of 1974.

__Percent of All Cases Referred to the AG still Pending in August, 1974__



Source: "Status of Actions Referred to the Office of the Attorney General".

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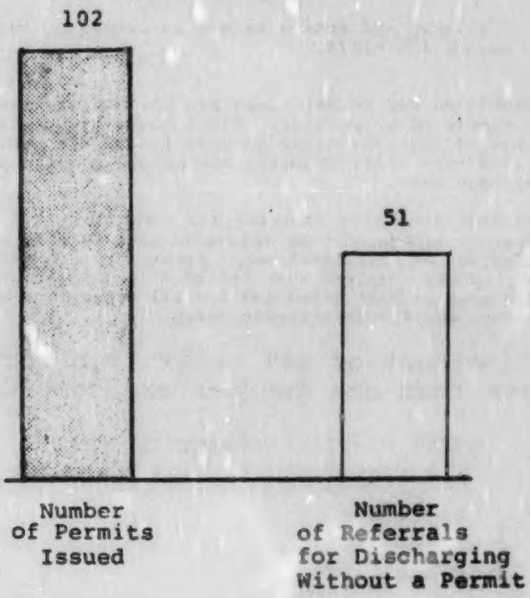
* The Attorney General attempts to avoid these delays and uncertainties by trying first to bluff/negotiate a satisfactory settlement before going to court. This is, however, a difficult task since (1) the cases sent him were referred because negotiations with the State had already broken down and (2) the Attorney General has no additional leverage he can bring to bear on the recalcitrant regulatee save the threat to go to court. And, on the record, such a threat is unlikely to greatly impress such regulatees, because court actions can be delayed for long periods and because only one injunction has ever been issued and that was in a minor case in which the Department had not even sought an injunction.

The only alternative, persuasion, has been ineffective without credible back-up enforcement capability.

Many new discharges in 1968-73 were initiated without permits and were referred to the Attorney General.*

Permits Issued and Referrals for Discharging Without Permits from 1968 through 1973



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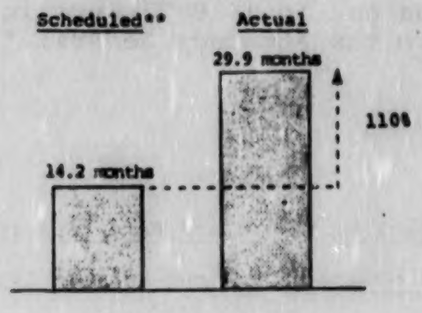
*Some but not all dischargers referred for discharging without permits later qualified for and received permits. None was issued an injunction, however.

Compliance with Department orders has been no better. The average Water Compliance order takes twice the time legally allowed it.



Average Compliance Time*

Source: Completed and active orders in sample of 60 orders issued 1967-1974.

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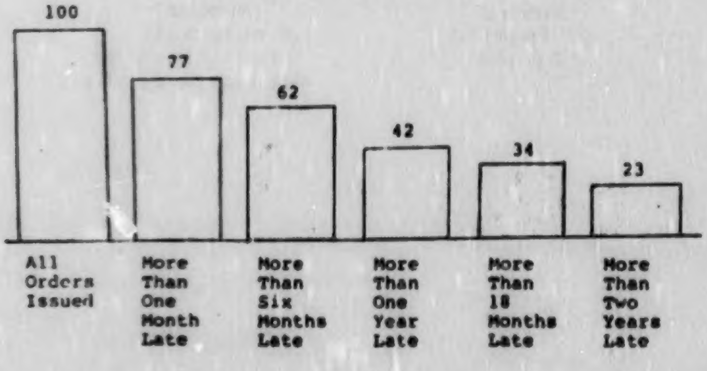
* The scheduled and actual times are the average times for all steps completed or pending. Since those steps still pending continue to log time prior to compliance, the actual time illustrated here underestimates the actual compliance time in the average case.

** The average scheduled time for all orders is 17.0 months. The average scheduled time indicated here is less because, for the purposes of this chart, only those steps for which the previous step was complete were included in the calculation. To use the average time scheduled for all steps as a basis of comparison would underestimate delay.

Moreover, forty-two percent of all orders run more than one year behind schedule; less than one quarter are completed on time:



Percent of Orders Experiencing Overruns*

Source: Compliance records of 47 completed and active orders in sample of 60 orders.

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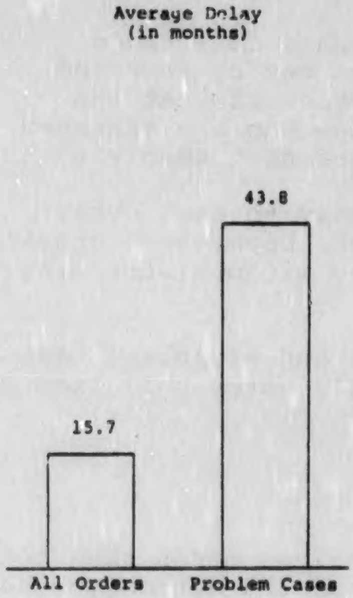
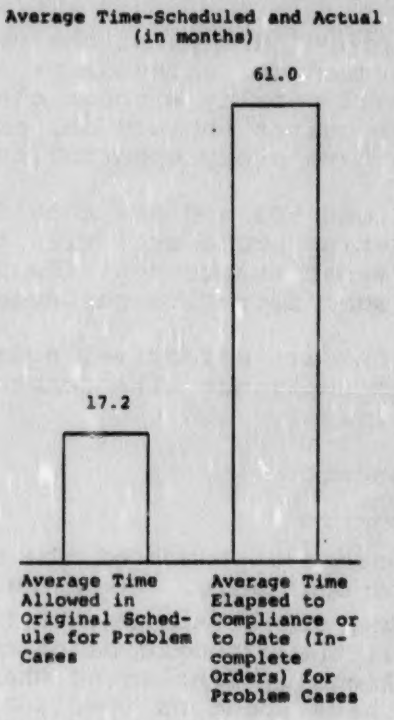
* Based on current status for all steps completed or pending and due for all active and completed orders in the sample.

These delays include extensions, tablings, referrals to the Attorney General and unexplained delays. A portion of this delay was legitimately unavoidable and therefore not an enforcement problem.* What percent of the delay was unavoidable is not known exactly. However, even if it was a large percent, the remainder would still represent massive noncompliance.

As is generally the case, a small number of regulatees take advantage of enforcement weaknesses and manage to delay for years. Eleven percent of all order recipients experience delays, none of which was even arguably unavoidable, longer than two years.





It is problems of this nature and gave rise to the Enforcement Act of 1973 and the Section 502 and 503 regulations.

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*Order timetables are of necessity guesses as to how long it will take to plan and install treatment systems. Individual cases differ widely and unforeseen problems often occur. The Department originally issued orders shortly after detection of pollution to gain immediate leverage with the polluter. This caused some order schedules to be unreasonable and thus resulted in overruns. Recently, it has begun to discuss pollution problems with dischargers in some detail before issuing orders. This should eliminate much unavoidable delay.

THE SECTION 502 AND SECTION 503 REGULATIONS

The Section 502 and 503 regulations have been written with three key objectives in mind.

- They are designed to provide an incentive just large enough to make complying with permit and order requirements economically attractive -- and no larger. These assessments will also ensure that those who comply voluntarily do not suffer an economic disadvantage relative to their non-complying competitors.
- The proposed regulations establish a full range of procedural safeguards: No one can be assessed a civil penalty without clear notice of what the law requires them to do, and those who are assessed will have every opportunity to defend themselves.
- Sections 502 and 503 should be easy to use. Their operating procedures will give the Department greatly increased enforcement flexibility without straining its administrative resources.

The regulations are effective, equitable and efficient means of combating noncompliance with Connecticut's water pollution control laws and policies.

The Economic Approach

The economic approach of the regulations makes them both effective and equitable. Sections 502 and 503 authorize the Department to impose civil assessments that will be just large enough to take away all the economic benefits of noncompliance from those who discharge illegally (including what they have earned with the money they should have spent on compliance during the period they delay). The regulations will be effective because they counterbalance the economic cause of noncompliance. This approach is fair to the violator: the assessments take away no more than the ill-begotten benefits of noncompliance, and all violators are assessed on the basis of the same standard. It also protects those that comply voluntarily by neutralizing the economic advantage their non-complying competitors otherwise would have.

The root cause of most Water Compliance enforcement problems is the fact that pollution control expenditures represent an economic loss to the discharger. There is generally no return on these expenditures. The permit applicant or order recipient is asked to give up both the cash to pay for equipment, installation, operation, etc. for pollution control and the profit it could have made by investing the cash elsewhere. By avoiding the pollution control expenditure entirely, the discharger can both save these expenditures and earn a profit on the use of the money elsewhere. By putting off the expenditure for a period of time, it can at least save the profit it could earn with the money over that period. Thus the economics of water pollution control encourage delay.

There is an additional incentive for post-67/73 dischargers to avoid the permit requirement. If they apply for a permit before constructing the facility that will cause the discharge, they run the risk that the Department will refuse to issue a permit and thus block construction. If they simply ignore the permit requirement and start their discharge, they greatly improve their bargaining position. It is much easier to disapprove a plan than an operating plant -- an in-place investment that has already created jobs and is paying taxes. This sort of step is always politically difficult and has, in fact, never been taken.

In spite of these economic disincentives, most dischargers have complied with permit requirements and orders either voluntarily or under pressure from the Department or the Attorney General. However, a significant minority have been very slow to do so and a few blatantly resist compliance as long as possible. Sections 502 and 503 reverse the economic incentives that currently motivate this uncooperative minority.

The proposed regulations enable the Department to eliminate the profitability of noncompliance. The following is a simple* example of how this will be accomplished. Assume that a firm applying for a permit or under order was required to make a one year expenditure of $10,000 for equipment, installation, operation, etc. Assume that the firm has a cost of capital of 11.5 percent. This figure (which is typical for many Connecticut industries) is in effect the minimum rate of return that would cause the firm to invest in a new project. If the firm did not make these expenditures, it would be assessed $11,150. The firm will choose to make the $10,000 pollution control expenditure rather than pay the assessment. Sections 502 and 503 make compliance the profitable option.

Charging delinquent dischargers what they have saved by delaying compliance will protect competing firms that have complied from unfair competition. If four companies competing in a five company market have installed expensive control facilities and the fifth has not, the fifth company will be able to underprice the other four and/or obtain greater profits. The economic assessments authorized by Sections 502 and 503 would remove the fifth company's unfair advantage.

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* This example is somewhat simplified for clarity and ignores the effects of inflation and tax savings, and the operation of the formula over longer periods, but the numbers are roughly the same as if all factors had been taken into account. All these variables are considered in the regulation. See the complete explanation of the economics of these assessments in Part III of this Volume.

In addition to being effective, these economic assessments are equitable. This clear, objective, accurate economic standard for determining the size of assessments leaves the Department with almost no scope for overassessing a source. Assessments can be no larger than the economic advantage a source has obtained through noncompliance. They provide incentives just large enough to make compliance attractive -- i.e., they are strictly remedial, not in any way punitive. The regulation's economic standard also gives the Department no scope for assessing different dischargers in arbitrarily different ways. Finally, as was noted above, the economic approach protects those who comply voluntarily from being put at an unfair competitive disadvantage by scofflaws.

The keystone of the proposed regulations is their economic approach to enforcement. It eliminates the basic cause of noncompliance -- its profitability. It is an equitable approach because it does this in a way that strictly limits administrative discretion, fully protects sources against overassessment, and ensures that both those who have and those who have not complied with permit requirements or orders are left in the same economic position.

Calculating Assessments

Calculating such economic assessments is a reasonably simple two step process: first, determining the cost of qualifying for a permit or complying with the disregarded order and second, calculating the benefits of having delayed these expenditures.

Determing the cost of compliance is the critical first step. In a good many cases this information will be readily available in the form of cost estimates based on approved engineering reports or plans and specifications for the treatment measures required for the permit or by the order. When such easily reviewed and verified estimates are not available, however, the Department has the expertise to make a reasonable estimate.

The proposed regulations provide a mandatory correction procedure (Sections 502(h) and 503(h)) to adjust such Department estimates once compliance is achieved and actual costs can be determined. Since the person assessed has full access to the cost data involved, this correction safeguard guarantees that assessments will be tied to actual costs. If anyone has paid a larger assessment than this correction procedure determines is warranted, they are guaranteed refunds with interest at the cost of capital rate used in calculating the original assessment. A person whose assessment is corrected will thus be in the same economic position as if data on actual costs had been used in the initial calculation.

The second step in calculating Sections 502 and 503 economic assessments involves determining the economic benefit of saving or delaying paying the costs of compliance. This is done with a capital budgeting formula identical to that commonly used by businessmen in evaluating investment options. It takes account of all the costs of compliance including initial capital investments, replacement costs, and operating and maintenance costs; it weighs the impact of taxes and inflation; and it prices the value of delay at a cost of capital rate of return appropriate for the person being assessed. A simple formula translates all these factors into a monthly assessment amount that is equal to the benefits of one month's noncompliance.

The Safeguards

In drafting the Enforcement Act of 1973, the Legislature provided a variety of safeguards for persons to whom it would be applied. Sections 502 and 503 go beyond the requirements of the statute in ensuring that the new enforcement tools will be used fairly. They guarantee the regulatee notice of potential liability and full procedural rights.

Ample notice of potential liability for civil assessments is required by the regulations. In Section 503 cases, the water pollution control order makes it clear to the recipient that it has a legal obligation to meet the time schedule in the order. Future Department orders will carry a notice of potential civil assessment liability for failure to comply promptly. In Section 502 cases, the Department is required to send a civil assessment warning letter upon detection of a probable violation of the permit requirement. In addition, if the Department cannot prove that such a discharger had notice of the permit requirement, it cannot assess for more than one year of pre-assessment illegal discharges. This cuts up to one year off the assessment period. Furthermore, if such a discharger takes prompt and effective action to qualify for a permit, the Department cannot assess for the period after receipt of the notice of violation. These provisions give the good faith discharger without notice a substantial assessment break. They are a compromise. Dischargers are responsible for knowing the law; and, by now, very few persons can plausibly argue that they knew nothing of their responsibility to control their discharge. Therefore, the Department did not want to make it impossible for it to impose assessments on persons who, as all too many now do, discharge illegally knowing the law -- even if the Department could not demonstrate that they had received formal notice. The Department can, of course, mitigate all or part of this remaining liability, if it sees fit. On the other hand, it wanted to limit potential liability where notice could not be demonstrated.

An order recipient or potential permit applicant can determine the maximum assessment for which he may become liable by looking at the regulation. Sections 502(d) and 503(d) spell out the absolute maximum and the maximum monthly assessments for various costs of compliance. Sections 502(e) and 503(e) make available a detailed explanation of the assessment formula, which will allow the regulatee to calculate what its actual assessment is likely to be. The regulations also require that the Department send the person to be assessed a notice of violation before the assessment takes effect. This notice explains the reason for the assessment, informs the person of his right to a hearing and gives the assessment amount. This amount is in effect a maximum for the individual, because, while it can be lowered (Sections 502(g),(h) and 503(g),(h)), it can never be increased. Thus, the regulatee always has ample notice of its potential liability before it must decide to accept or contest an assessment.

Sections 502 and 503 also provide numerous procedural safeguards for persons brought into the assessment process. They have 20 days after receipt of a notice of violation to apply for an administrative hearing and may appeal the result of the hearing to the courts. Connecticut's Administrative Procedure Act and the Rules of Practice of the Department apply to all proceedings under the regulations, and they assure persons who are assessed full procedural safeguards such as guarantees of the opportunity to present evidence and to cross-examine. Findings and decisions must be spelled out along with supporting facts, in writing. Finally, the amount assessed must be adjusted to reflect the actual costs of compliance when they can be accurately determined. The results of such correction hearings can also be appealed to the courts.

The Use of the Economic Assessment Device

The civil assessment tools provided by Sections 502 and 503 will be used in conjunction with existing enforcement options to give the Department a more flexible and effective enforcement capability. Although it will require the Water Compliance Unit to undertake some tasks that it does not now perform, it should on balance reduce the Department's administrative burden, chiefly because a credible enforcement tool will increase voluntary compliance and thereby reduce the need for time-consuming follow-up and negotiations.

Section 503 would give the Department several new ways of responding to noncompliance with the terms of an order, be they interim steps or the final, overall compliance deadline. Its most likely initial response would be to send the offending source a warning letter under Section 503 (f)(1), especially for noncompliance with intermediate steps. If one or more such letters does not achieve the desired results, the Department could levy an economic civil assessment. Because the Department would be authorized to take this second step, very few cases should require anything more than the first warning letter.

These new tools would supplement, not replace, the Department's existing enforcement options. It could extend or table the order deadline, as it now does, if there appeared to be a legitimate excuse for delay. On the other hand, it could also still refer a case to the Attorney General if the order violator were extremely recalcitrant or the environmental threat from noncompliance were sufficiently great.

Section 502 will also be used in conjunction with referrals to the Attorney General. Such injunctions may be necessary (1) if the discharge is dangerous and must be stopped immediately or (2) if the costs of compliance are so high that they would require assessments larger than those allowed by the Enforcement Act's maxima.

The procedures for levying assessments under Sections 502 and 503 are much the same. The first step is that of calculating the assessment amount. The chief task here is determining the cost of qualifying for a permit or complying with an order. The Department will either use cost data from the person assessed, if it is available, or it will make its own estimates. For most cases it can make these estimates with tolerable accuracy quickly, without going through the detailed engineering work that consulting engineers must do to design treatment systems. Consequently, the administrative costs of the process can be kept to a reasonable level, the Department will not interfere with the work of consulting engineers and, because of the correction process, the accuracy of the system will not be jeopardized. This cost of compliance information, along with figures for the cost of capital, tax rates and inflation rates -- all from appropriate, readily available tables -- provide all the data necessary for a small desk calculator to determine the assessment amount -- in seconds. If the Department decides to impose the assessment, all that remains for it to do is to notify the noncomplying source formally of its assessment in a notice of violation.

The source has 20 days after receipt of a notice of violation to contest it. It has a right to a hearing conducted by the Commissioner, a Deputy Commissioner or a duly appointed hearing officer pursuant to the APA and the Department's Rules of Practice. If the assessment amount is at issue in the hearing, the Department can defer collection and postpone the hearing until adequate cost information is available. More commonly, the Department will simply accept the order recipient's cost estimates for the purposes of deciding how much of the assessment is to be collected (leaving the amount assessed unchanged so that, if the Department's initial higher estimate ultimately proves correct, the higher amount will still be due).

After the conclusion of the hearing, or of any appeals taken from the Department's decision, or after the expiration of the time for requesting a hearing, the notice of violation becomes a legally binding order.

The Department can start to collect as soon as its order is final. However, it has the discretion to collect the assessment at such intervals and in such amounts as it determines will best serve its regulatory and administrative purposes. For instance, if it appears likely that its cost of compliance estimates were on the high side, the Department can collect only part of the assessment to avoid the need for refunds later. If a delinquent discharger is having serious financial difficulties, the Department can allow the discharger to pay at a lower rate over a longer period of time.

If a person assessed refuses to pay, the Department can easily collect by docketing the final assessment order with a Clerk of the Superior Court. When this is done,the assessment automatically becomes a judgment of that court. If necessary, the Sheriff will attach and auction whatever assets of the delinquent source he must to pay the assessment. (Section 22a-6b(h) of the General Statutes.)

There is one potentially serious administrative problem that Section 503 may cause for the Department, but Section 502 provides a potential means of avoiding it. With Section 503 in effect, persons issued orders will be much more likely to request hearings than they are now when order timetables cannot be rigorously enforced. With Section 503 in force, accepting an order timetable entails definite risk: missing deadlines automatically creates liability to assessment. By contesting the compliance order, regulatees can minimize this risk: as long as the order is not final, its deadlines are not legally binding and cannot be enforced under Section 503.

If a regulatee is already liable under Section 502, however, the Department has a lever it can use to discourage such contests: it can drop or lower Section 502 liability if the regulatee does not contest the order. The regulations make this easy: the Department cannot impose Section 502 liability once the regulatee is under a binding Section 503 order. And the longer a regulatee takes to get under the protection of an order, the greater its potential 502 liability becomes.

Section 502 could be made to cover almost all dischargers not already permitted or under order. Now it covers both entirely new discharges and -- importantly -- major changes in a discharge that are not permitted. It is not clear whether or not it could be used against persons who now have a permit and who maintain their discharge after their existing permit expires without obtaining a new one. Probably a statutory amendment is necessary to make it clear that continued operation is illegal without a permit renewal. However, once this point is clarified, dischargers will, almost by definition, either be operating under the terms of an order* or permit enforceable by Section 503 or be liable to a Section 502 assessment.

Once the Department enforces the terms of its orders tightly with Section 503, it must be doubly sure that its order compliance timetables are reasonable and that it continues to grant extensions when they are reasonably justified. The Water Compliance Unit's relatively new practice of reviewing its proposed orders with its regulatees before issuing them is an important step in this direction. Not only is such reasonableness important as a matter of equity, but it is the most important tool available to the Department to hold down the number of order contests it will have to handle.

The operation of the Section 502 and 503 regulations should lighten the Department's administrative load, primarily because of a significant increase in voluntary compliance. A study of analogous enforcement situations where effective enforcement tools replaced limited enforcement capability suggests that voluntary compliance will increase to the point that 72 percent of all violations will be eliminated without enforcement action.** If such is the case (and given the high noncompliance rate now being experienced, it seems quite plausible), the average annual cost of processing all cases that go to order (virtually all significant discharges) will decline from 16 to 22 percent.

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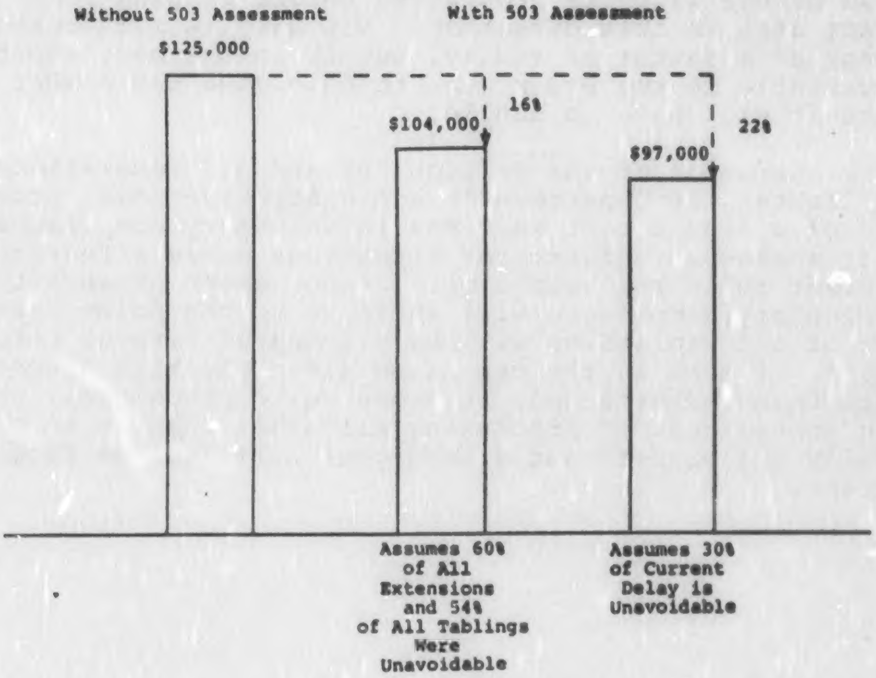
*Although authorized to issue orders to new sources discharging without a permit under Section 25-27 of the General Statutes since 1967, the Water Compliance Unit has been reluctant to issue orders to such illegal dischargers, thereby authorizing their continued discharges. Once it can impose a 502 assessment, and once an order can truly be enforced, the Unit is likely to be much less reluctant.

**See CEP back-up study "Evaluating the Impact of More Effective Enforcement on Voluntary Compliance," available at the Connecticut State Library, Hartford, Conn., or from Mr. William Drayton, McKinsey & Company, 245 Park Avenue, New York, New York, 10017.

Annual Administrative Costs for Enforcement
(Current Caseload - Costs Per Year)



Section 502 will also result in administrative cost savings for permit cases. The Department will save time in negotiating with dischargers during the permit application phase, particularly because of the "prompt and effective action" incentive. In addition, the likely increase in voluntary compliance will reduce costs for detection and referral to the Attorney General, which now run $119 and $42 per case respectively.* The total savings may not be large if the 1968 through 1973 rate of 16 unpermitted discharge cases and 8.5 referrals per year continues. However, the number of cases more than tripled in 1974, making the possible savings more significant.

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* See Part VI of this Volume.

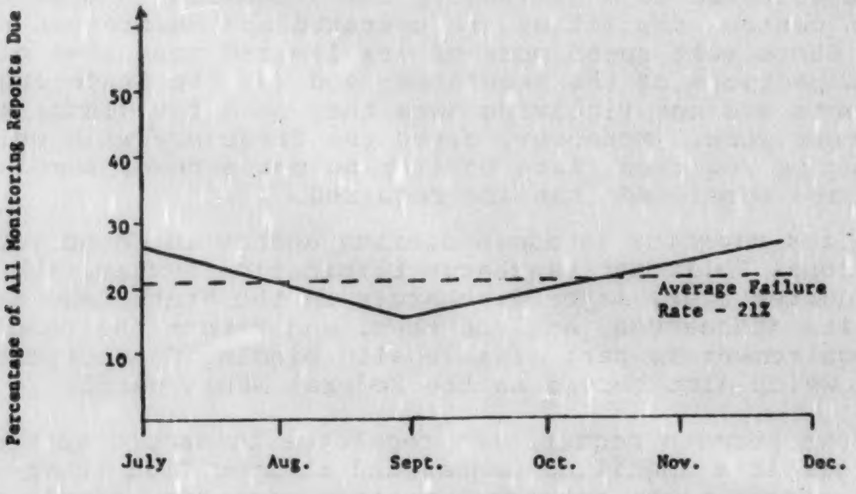
CONCLUSION

Sections 502 and 503 give the Water Compliance Unit a means of combating its' two greatest enforcement problems -- unpermitted discharges and noncompliance with order deadlines. They both provide for civil assessments based on a clear economic standard that will bring about compliance by taking away the present, often substantial, economic benefits of noncompliance. This administratively workable standard and the procedural and informational safeguards in the regulations make the system fair both to those who voluntarily comply with environmental laws and to those who do not.

CHAPTER II

USING ECONOMIC CIVIL ASSESSMENTS TO ENFORCE WATER DISCHARGE MONITORING REQUIREMENTS

Roughly one-fifth of all the monitoring reports required under the National Pollutant Discharge Elimination System (NPDES) program in Connecticut are not submitted.



Percentage of Due Reports Not Submitted Each Month (1974)

The relatively small civil assessments provided by the Monitoring Report Civil Assessment Regulation (Section 504) give the Department a simple but effective and equitable tool that will allow it to cut this delinquency rate.

Now the Department has two options to choose between in trying to enforce the monitoring report requirement: (1) persuasion or (2) going to court to seek a forfeiture or injunction. Persuasion is time-consuming and, as the above chart illustrates, ineffective in all too many cases. Going to court is too complex, costly, and slow -- and the remedies too severe -- to be a practical alternative for use on such a simple procedural matter, especially one that may arise repeatedly and in more than a handful of cases.

Section 504 provides the Department with a simple, effective, and equitable tool to enforce any monitoring and reporting it requires regulatees to undertake. It authorizes the Department immediately to impose a civil assessment that will take away the economic benefits of nonsubmission and thus the chief incentive to avoid the requirement.

This Chapter (1) explains the importance of cutting this delinquency rate, and (2) outlines how the 504 civil assessment will work.

OBTAINING MONITORING REPORTS: THE PROBLEM

If monitoring reports are not submitted: (1) the regulatee may be encouraged to avoid paying the attention it must to ensure that its control facilities are operated and maintained properly; (2) the State must spend more of its limited resources on expensive field inspections of the regulatee; and (3) the State and Federal Governments are not receiving data they need for planning and enforcement work. Moreover, given the frequency with which reporting is required, late monitoring means fewer samples and reports are submitted than are required.

In its capacity as administering agency in Connecticut of the National Pollutant Discharge Elimination System, the Department requires every major discharger in the State regularly to sample its discharges, analyze them, and report the results. This requirement is part of a legally binding Connecticut order or permit, which also serves as the Federal NPDES permit.

These permits require the regulatee to sample each of its discharges in a specified manner and at specified intervals. Thus, a permit might require a monthly composite sample from one discharge and a weekly grab sample from another. (A grab sample, as its name suggests, involves scooping a given volume of water out of the discharge in a short period of time. A composite sample is a series of grab samples taken over a long period of time, usually hourly for four hours, in volumes that are in proportion to flow and aggregated into one sample.) The permit recipient is required to have the samples analyzed for various pollutants and other parameters (like temperature and pH). It must then report the results to DEP on a regular basis, usually monthly. When sampling intervals are short (e.g. daily), analysis of several samples are required to be presented in one report. When the sampling intervals are larger (e.g. monthly), one report is submitted per sample, at the same interval as is required for the sampling.

An indirect but important benefit of this periodic monitoring requirement is that it does not allow the regulatee to ignore the operation and maintenance of its control facilities -- as it otherwise might since these facilities, unlike the rest of the regulatee's plant, do not contribute to production. Ensuring that the scofflaw minority pays attention to monitoring will help keep the attention of this high risk group on proper operation and maintenance as well.

Ensuring prompt monitoring and reporting will also help prevent the Department's having to undertake very expensive extra field inspections. Even with monitoring reports, some field inspections will remain necessary: there are too many ways in which the results can be inadvertently or deliberately altered. However, if the regulatee is reporting regularly, the results of field inspections can be compared with the regulatee's monitoring reports and the accuracy of the reports assessed. If the reports are found to be inaccurate, the Department knows it has a problem and can respond. If no reports are submitted, the Department must sample more frequently if it is to keep track of the discharger, and this takes staff away from other pressing problems.

Finally, if monitoring requirements are ignored, both the regulatee and the public are denied a measure of how well the control facility is operating.

Late monitoring has little value. Since most regulatees are required to monitor frequently, usually monthly, a regulatee that does nothing for a month can never catch up: its test for that month is lost, not late.

THE 504 ASSESSMENT

The 504 assessment will allow the Department to cut the current delinquency rate both sharply and quickly. If a permittee, having failed to respond to persuasion, does not submit a required report, the Department will be able immediately to assess him an amount sufficient to eliminate any economic incentive for noncompliance.

The 504 assessment works very simply. Through a series of surveys, the Department has determined the typical costs of each of the component parts of complying with a monitoring report requirement -- sampling the discharge, delivering the sample to a lab, having any of 70 analyses done (any one or combination of which may be required in a particular case), and reporting the results to the Department. This cost information was used to develop two schedules:

- A schedule of maximum assessments (found in Section 504(f) of the regulations). This schedule creates a ceiling above which no assessment may go. It was developed primarily from the most expensive instances reported in the surveys.

- The first of a series of Monitoring Report

Assessment Lists that list the typical* costs of each possible monitoring and reporting step and that will be used to determine individual assessments. (A copy of the current List is attached at the end of this Chapter; note that assessments based on the costs in it will be much lower than the maxima allowed by Section 504(f).) This last, or any revisions, must be published in the Connecticut Law Journal before it can take effect. See Section 504(d).

In the event that an assessment becomes necessary, all the Department would do is (1) identify what was required in the permit but not done and (2) add the costs of what was not done from the Assessment List. The resulting amount is the civil assessment due.

Example: A Connecticut discharger is required to report monthly on the following discharge parameters: flow, total suspended solids, cyanide, total chromium, hexavalent chromium, copper, iron, and pH. If it failed to submit a report and the Department decided that a civil assessment was warranted, the assessment would be approximately the following: the Department would determine the cost of each missed requirement from the Assessment List and add:

Sampling (composite)		$15
Delivery		4
Reporting		7
Analysis		
Total suspended solids	8	
Cyanide	16	
Chromium - total	11	
Chromium - hexavalent	11	
Copper	10	
Iron	9	
pH	3	
Total Analysis		68
Total Assessment Amount		$94

The Department will update the Assessment List, or parts of it, as necessary to make sure its costs are realistic -- thereby ensuring that assessments based on it are effective but not excessive. This will be done using the same survey approach employed in calculating the initial list or another approach that it determines will give statistically superior results. Revised lists must be published in the Law Journal to be effective.

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*The first list uses mean costs. The Department could use other statistical devices such as the median or mode if it determines that this would be more effective or fair.

These economic assessments, even though generally quite small, will work. Regulatees will prefer complying to paying. Section 504 assessments include provision for the time company managers and staff spend monitoring and reporting; their time is thus accounted for. If they incline not to comply because they resent the requirement, they probably will like having to pay the State a civil assessment even less. Moreover, continued noncompliance will not only be economically unprofitable, but it will probably attract the (unwelcome) attention of the Department's enforcement staff.

Section 504 assessments will be both effective and clearly equitable chiefly because of their close link to economics. They just fit the economics of each case: if a discharger fails to submit one report with a few simple analyses, that is all it can be charged for; if it continuously fails to submit several complex reports, its assessment will be much larger. They consequently remove cost savings as a motive for noncompliance. (In fact, because the assessment is based on average costs, it will always be higher than an amount for which a noncomplying permittee could carry out its monitoring.) At the same time, the regulatee is charged no more than what it has saved as a result of its noncompliance.

MONITORING REPORT ASSESSMENT LIST

(September 1975)

Monitoring Requirement	$	Monitoring Requirement	$
(A) Sampling			
1. grab sample*	8	32. Magnesium	9
2. composite sample**	15	33. Manganese	9
(B) Delivery***	4	34. Mercury	18
		35. Molybdenum	11
(C) Reporting****	7	36. Nickel	12
		37. Potassium	10
(D) Analysis*****		38. Selenium	18
		39. Silver	11
General		40. Sodium	9
		41. Thallium	13
1. Alkalinity	4	42. Tin	14
2. Biological oxygen demand	20	43. Titanium	16
3. Chemical oxygen demand	15	44. Vanadium	17
4. Total solids	8	45. Zinc	11
5. Total dissolved solids	8		
6. Total suspended solids	8	Nutrients, Anions, and Organics	
7. Total volatile solids	7		
8. Ammonia (as N)	11	46. Organic nitrogen (as N)	15
9. Kjeldahl nitrogen (as N)	15	47. Ortho-phosphate (as P)	8
10. Nitrate (as N)	7	48. Sulfate (as SO_3)	6
11. Total phosphorus (as P)	10	49. Sulfide (as S)	6
12. Acidity	4	50. Sulfite	7
13. Total organic carbon	24	51. Bromide	10
14. Hardness	5	52. Chloride	5
15. Nitrite (as N)	7	53. Cyanide	16
16. pH	3	54. Fluoride	11
		55. Chlorine-total residual	6
Trace Metals		56. Oil and grease	15
		57. Phenols	17
17. Aluminum	12	58. Surfactants	12
18. Antimony	12	59. Algicides	26
19. Arsenic	14	60. Benzidine	36
20. Barium	12	61. Chlorinated organic compounds (except pesticides)	36
21. Beryllium	15		
22. Boron	16	62. Pesticides	32
23. Cadmium	11		
24. Calcium	8	Physical and Biological Parameters	
25. Chromium VI	11		
26. Chromium total	11	63. Color	4
27. Cobalt	12	64. Specific conductance	6
28. Copper	10	65. Turbidity	4
29. Gold	7	66. Fecal streptococci bacteria	14
30. Iron	9	67. Coliform bacteria (fecal)	13
31. Lead	11	68. Coliform bacteria	12
		69. Other analyses	12

* For every grab sample required by the permit or order for which no analyses are reported on or before the due date or the end of the reporting interval specified in the permit or order.

** For every composite sample required by the permit or order for which no analyses are reported on or before the due date or the end of the reporting interval specified in the permit or order.

*** For every report not submitted on or before the due date of the end of the reporting interval specified in the permit or order.

**** For every report not submitted on or before the due date or the end of the reporting interval specified in the permit or order.

***** For every analysis required by the permit or order for which no results are reported.

PART II

BASELINE PROFILE OF THE ENFORCEMENT PROCESS FOR PRIVATE AND INDUSTRIAL SOURCES IN THE WATER COMPLIANCE AND HAZARDOUS SUBSTANCES UNIT

BASELINE PROFILE OF THE ENFORCEMENT PROCESS
FOR PRIVATE AND INDUSTRIAL SOURCES
IN THE WATER COMPLIANCE AND HAZARDOUS SUBSTANCES UNIT

INTRODUCTION

This document describes and analyzes the enforcement experience of the Water Compliance and Hazardous Substances Unit (hereinafter referred to as the Water Compliance Unit) since 1967. The study focuses on private, largely industrial, sources. It defines who is subject to regulation and studies the extent of compliance delays and the nature and usefulness of the current means for enforcement.

This analysis provides an understanding of existing processes and problems that

- * was a prerequisite for the design of enforcement tools that would
  - address the important problems,
  - mesh closely and economically with existing administrative procedures,
  - avoid creating loopholes on the one hand and unnecessary and unfair burdens for those subject to regulation on the other.
- * will provide the baseline that is necessary to make possible a future evaluation of the effects of the new enforcement approaches now being introduced.

The study deals in the following order with each of the three program areas for which the Enforcement Project and the Water Compliance Unit have developed new enforcement tools: orders to abate pollution or to correct potential sources of pollution (issued under Sections 25-54g, h, j, k, l, and aa of the Connecticut General Statutes); permits for discharges initiated after May 1, 1967 (as required in Section 25-54i of the General Statutes); and monitoring reports submitted in compliance with the terms of permits or orders.

CHAPTER I - ORDERS

Chapter I of this appendix discusses the number and types of orders issued, the substantial delays in compliance, the possibility that much of this delay can be cut, the responses to delay currently available to the Department, and the increased administrative costs occasioned by overruns in order compliance. Analyses of the baseline data show that

- 85 percent of all orders issued have been to private sources; in recent years 95 percent of these cases have been industrial.

- The average order overruns its deadline by more than 100 percent and almost half comply more than a year behind schedule.

- A substantial proportion of the delay can probably be cut.

- Other than going to court, which is slow, expensive, and uncertain, the Department has not had any way of forcing compliance with its orders. Most delays are merely "tabled".

- Delays increase the Department's administrative costs 55% per case on average.

CHAPTERS II AND III - PERMITS AND MONITORING REPORTS

The Water Compliance Unit has experienced enforcement difficulties in two other areas of its work:

* Permits. Section 25-54i of the Connecticut General Statutes requires that all discharges initiated after May 1, 1967 be approved and permitted in advance. This requirement allows the Department to ensure that all new sources are adequately controlled.

More than one-third of all new sources have had to be referred to the Attorney General for failing to obtain a permit. Such cases account for 27 percent of all Water Compliance referrals.

* Monitoring Reports. National Pollutant Discharge Elimination System (NPDES) permits issued by the Department require permittees periodically to report on the amount of water and the nature and level of pollutants they are discharging. These reports are useful to both the Department and the source as a

means of getting information on the continuing effectiveness of installed water pollution control facilities. To obtain the same information without the cooperation of permittees would require an increase in the number of field inspections, thus diverting already overburdened staff from other more pressing responsibilities.

Over 20 percent of these reports are now delinquent. The Department has no means currently available for enforcing compliance with the monitoring report requirement. Going to court over such a relatively small procedural matter is entirely unrealistic.

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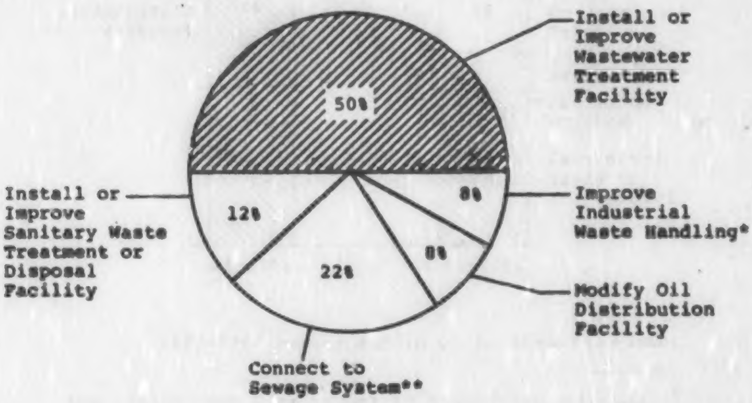
I - Orders: A Profile

HALF OF THE ORDERS REQUIRE NEW OR SUPPLEMENTAL FACILITIES FOR (PRE-) TREATMENT OF INDUSTRIAL WASTEWATERS.

Percent of all Orders Issued, 1967-74



Source: Sample of 60 orders issued 1967-74.

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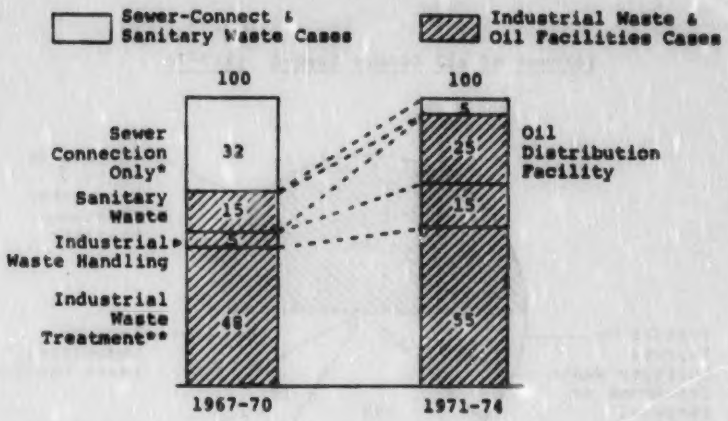
* Orders in this category contain miscellaneous directives specifically tailored to the peculiar pollution problem addressed by the order.

** For discharges of industrial, commercial, or sanitary waste.

I - Orders: A Profile

95 PERCENT OF ALL POST-1971 NON-MUNICIPAL ORDERS HAVE REQUIRED TREATMENT OR CONTROL FOR INDUSTRIAL WASTEWATERS, WHEREAS HALF THE ORDERS ISSUED IN 1967-70 WERE FOR RELATIVELY SIMPLE SEWER-CONNECT OR SANITARY WASTE CASES.[+]

Percent of All Orders Issued



Source: Sample of 60 orders issued 1967-1974.

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* Includes discharges of industrial, commercial, and sanitary wastes.

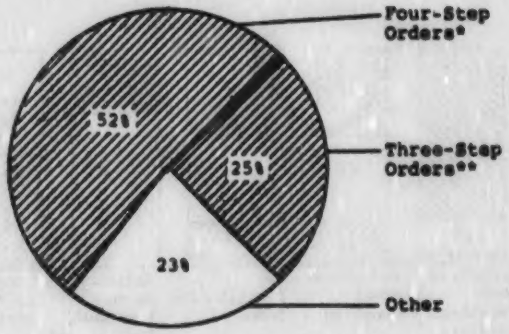
** Includes discharges to streams, ground, and sewers.

[+] In 1974 the Department began to focus more effort on non-industrial problems once again.

I - Orders: A Profile

75 PERCENT OF ALL ORDERS SET SEPARATE DEADLINES FOR PLANNING (ONE OR TWO STEPS), OBTAINING MATERIALS, AND INSTALLING CONTROLS.

Percent of all Orders (1967-1974)



Source: Sample of 60 orders issued 1967-64.

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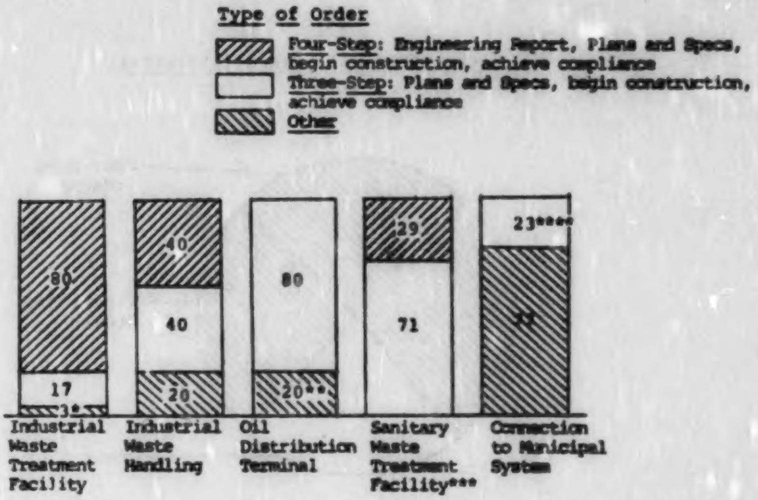
* Deadlines for: (1) submitting an Engineering Report, (2) submitting Plans and Specs, (3) beginning construction, (4) achieving compliance.

** Deadlines for: (1) submitting Plans and Specs, (2) beginning construction, (3) achieving compliance.

I - Orders: A Profile

THE NUMBER OF SEPARATE STEPS IN AN ORDER DEPENDS ON WHAT THE ORDER REQUIRES.

Number of Steps by Type of Order Directive
(in percent of all orders of each type)



Source: Sample of 60 orders issued 1967-1974.

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* A case in which plans and specs had been approved before the order was issued.

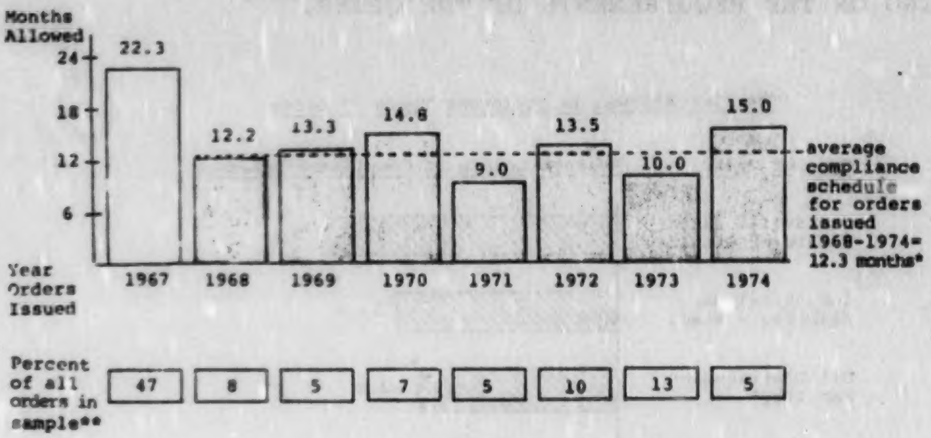
** A special situation calling for no more than a report.

*** The 29% of all orders with four steps required modification of existing treatment facilities; the other 71% with three-step orders were required to install disposal systems.

**** These three-step orders allowed the option of installing subsurface disposal (in three steps) or connecting to the sanitary sewer (in one step).

THE AVERAGE ORDER ALLOWS ROUGHLY ONE YEAR FOR A SOURCE TO COME INTO COMPLIANCE.

Average Length of Compliance Schedule



Source: Sample of 60 orders issued from 1967 to February, 1974.

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* The average compliance schedule is the average length of all orders issued in 1968-1974 or the average of the annual average order lengths weighted by the proportion of all orders issued in the given year.

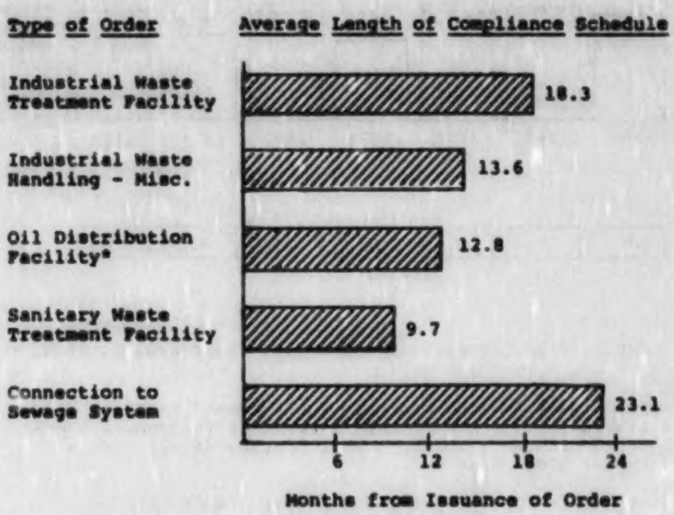
** Since the sample consists of roughly every twentieth order selected from a chronological list of orders issued (see Appendix), the proportion of sample orders issued in each year closely approximates the actual distribution of orders issued over the years covered (1967 to February, 1974).

DISCUSSION: Engineers in the Water Compliance Unit report that the order schedules they write are all designed to give the discharger ample time to meet the specified deadlines. Further, each order is reviewed for reasonableness by the Unit's senior staff at a regular monthly meeting before it is issued. The Unit's recent pattern of discussing its proposed compliance schedule with the source prior to issuing the order is a useful added means of ensuring that order timetables are appropriate to each particular case. The large variation in average order lengths for each year from 1968 to 1974 is probably explained by the small size of the sample on which the cell for each year is based. However, the substantially greater average length of orders issued in 1967, the first year during which orders could be issued, relative to the average length of orders issued in any subsequent years is significant. 1967 orders were exceptionally long because: (1) Many of the orders issued then were to connect to planned but slow-to-develop municipal sewers and represented an early Department priority to coordinate the long range planning and construction of municipal sewerage systems; (2) The Department's initial focus was on the largest, often unusually complex private/industrial sources; and (3) The Department had to schedule compliance deadlines in such a way that its very limited engineering staff could manage the volume of review and enforcement work falling due at any one time period.

I Orders: A Profile

HOW MUCH TIME IS ALLOWED IN ORDER TIMETABLES VARIES DEPENDING ON THE REQUIREMENTS OF THE ORDER.

The Time Allowed in Different Types of Order



Source: Sample of 60 orders issued 1967-1974.

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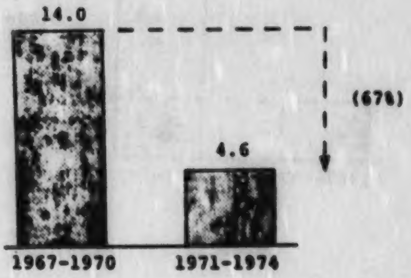
* Excluding one order with a two-month compliance schedule requiring only a report with recommendations for modification of the facility and/or operating procedures.

DISCUSSION: The long time allowed for sewer connections reflects the facts that (1) many dischargers could not connect until a planned sewer reached their site and (2) the planning and installation of municipal sewers often is a slow process. Most of the time allowed in industrial wastewater treatment facilities orders is for detailed study and design prior to construction.

I - Orders: A Profile

RECENTLY LESS THAN 5 PERCENT OF THOSE ISSUED ORDERS HAVE REQUESTED HEARINGS ON THEIR ORDERS, A 2/3 DROP FROM 1967-70.

Percent of Order Recipients that Request Hearings

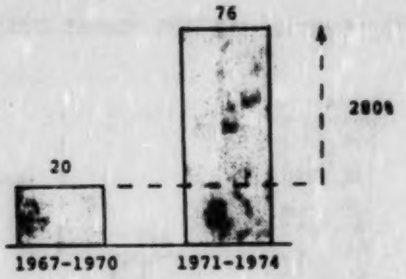


Source: "Summary of Actions", Minutes of Monthly Water Compliance Senior Staff Meetings.

I - Orders: A Profile

75 PERCENT OF ALL RECENT HEARING REQUESTS HAVE BEEN POSTPONED OR TABLED, A SHARP INCREASE OVER 1967-70.

Percent of All Hearing Requests Postponed or Tabled



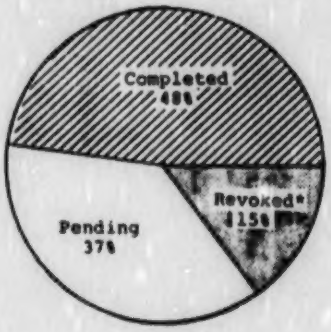
Source: "Summary of Actions", Minutes of Water Compliance Senior Staff Meetings.

DISCUSSION: The Department seeks to avoid holding hearings because of their great cost to the State, chiefly the large amount of senior staff time they consume. Regulatees generally do not object to postponing the hearing because, until it is held, the order has no legal effect. Once the Department develops an effective means of discouraging delays in complying with the terms of a binding order, regulatees will have an even greater incentive to request hearings -- as a means of avoiding the risk of accepting an order that is both theoretically and in fact enforceable. The Department will need either a means of discouraging such contests or a way of processing them quickly and economically.

I - Orders: A Profile

ALMOST TWO-THIRDS OF THE ORDERS ISSUED HAVE BEEN COMPLETED OR REVOKED.

Status of all Orders Issued Since 1967



Source: Sample of 60 orders issued 1967-1974.

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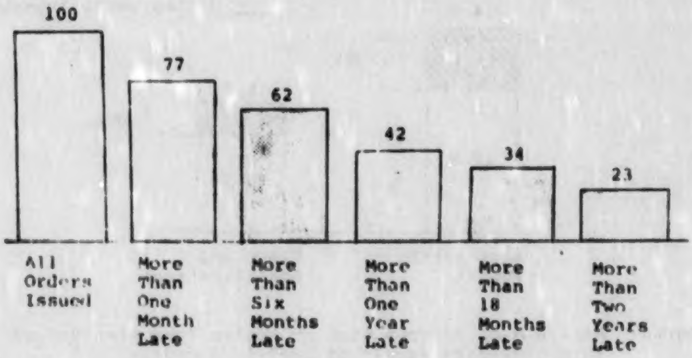
* Orders are revoked when the original reason for issuance is removed -- e.g. when a company goes out of business or discontinues the product line creating the discharge addressed in the order.

I - Orders: Delays

42% OF ALL ORDERS RUN MORE THAN ONE YEAR BEHIND SCHEDULE; LESS THAN ONE QUARTER ARE COMPLETED ON TIME.

Percent of Orders Experiencing Overruns*



Source: Compliance records of 47 completed and active orders in sample of 60 orders.

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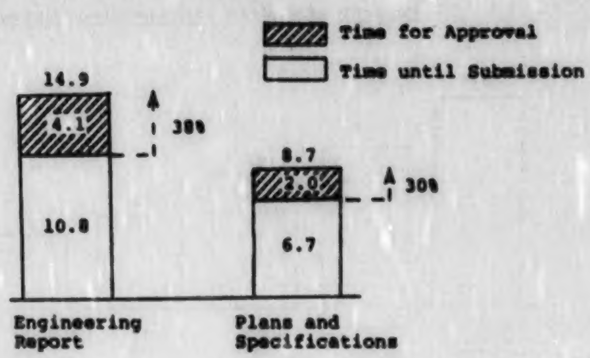
* Based on current status for all steps completed or pending and due for all active and completed orders in the sample.

I - Orders: Delays

DEP MUST BE CAREFUL TO INCLUDE TIME REQUIRED FOR DEPARTMENT APPROVAL OF PLANS+ -- ONE THIRD OF ACTUAL TIME IN BOTH PLANNING STEPS -- IN SCHEDULED TIME.

Average Actual Time for Submission and Approval
(in months)



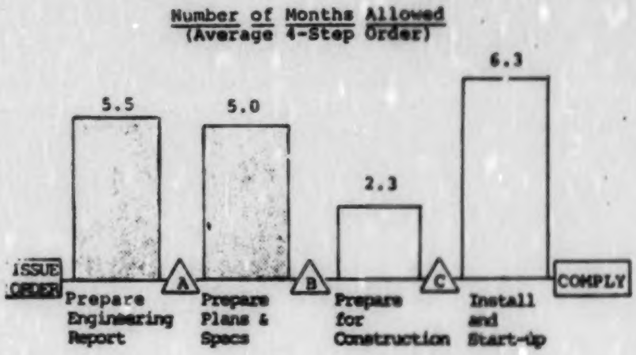
Source: Analysis of 29 completed or active Four-Step Orders in the 60-case sample of 1967-1974 orders.

DISCUSSION: If order compliance timetables did not make adequate provision for the time it takes Department engineers to review engineering reports and proposed plans and specs, regulatees would become subject to enforcement action for delays beyond their control. The Department handles this potential problem (1) by taking the normal period required for such review into account in establishing its order schedules and (2) by providing that, in the civil assessment regulations, if Department review lasts longer than the normal routine processing times used in establishing the order schedule, delay attributable to this fact shall not be considered a violation of the order timetable. The Department may also stipulate in its order that the period required for Department review is excluded from both the time allowed in the order compliance timetable and the calculation of how long it took to meet each deadline. (For example, the order would give a regulatee three months to submit an engineering report, four months after the approval of the engineering report to submit plans and specs, etc.)

+ The approval period includes time for discussion of conceptual design or detailed plans as well as revision of the original submission. The length of the approval period depends largely on the quality of the report or plans submitted to comply with the order schedule.

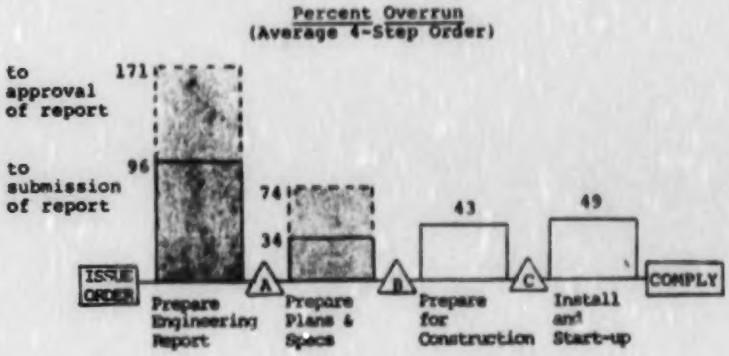
I - Orders: Delay

MOST OF THE TIME ALLOWED IN AN ORDER IS FOR PLANNING ...



Source: Four-Step Orders in sample of 60 orders,1967-1974.

... AND THESE PLANNING STEPS SUFFER THE LARGEST PERCENT OVERRUNS.



Source: Four-Step Orders in sample of 60 orders, 1967-1974.

CUTTING DELAY

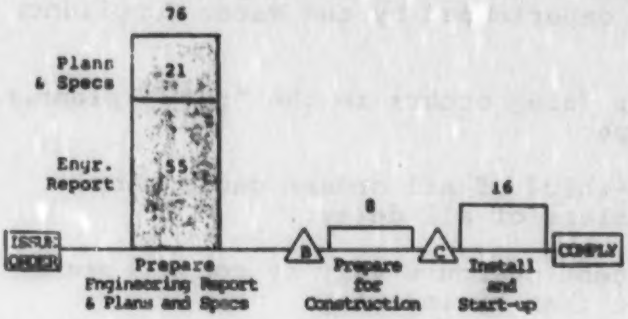
The Department could cut the very high level of compliance delay now being experienced by the Water Compliance Unit.*

- Most delay occurs in the "soft" planning steps.
- One-third of all orders cause three quarters of all delay.
- Percent overruns vary by company much more than by industry.
- However, percent overruns do vary with what is required in the order.
- Water Compliance experiences more delay than Air Compliance (although the two are not entirely comparable).
- Percent overruns have increased substantially in recent years.

* From a close, but inevitably judgmental analysis of the compliance records of the 47 completed or active orders in the 60 case sample, we estimate that up to 70% of the delay is avoidable -- i.e. due to recalcitrance or procrastination by the regulatee. The remainder of the delay may be due to unavoidable circumstances including, among others, inclement weather, strikes, or delays by the Department.

I - Orders: Cutting Delay

PLANNING OVERRUNS ACCOUNT FOR 76 PERCENT OF ALL DELAY IN FOUR-STEP ORDERS.



Percent of Total Delay*
(Four-Step Orders)

Source: Four-Step orders in sample of 60 orders, 1967-1974.

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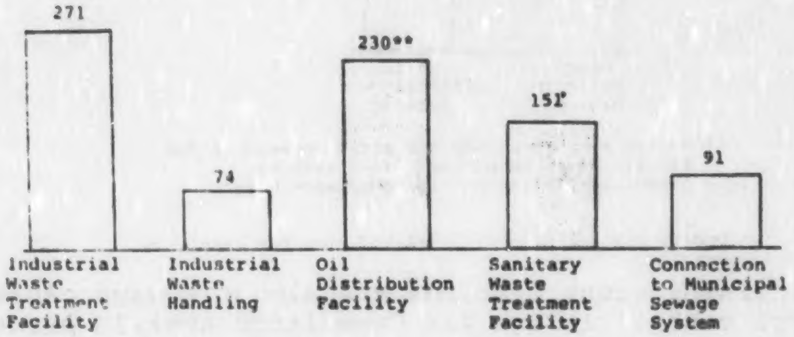
* Percentage delay attributed to engineering report and plans and specs includes delays for both submission and approval.

DISCUSSION: It seems highly likely that the large proportion of total delay attributable to planning steps could be cut sharply. Planning is not constrained by possible shortages of physical capacity or materials; it is a "soft" process more likely to be held back by procrastination.

I - Orders: Cutting Delay

HOWEVER, PERCENTAGE OVERRUNS VARY WITH THE TYPE OF ORDER: INDUSTRIAL WASTE TREATMENT AND OIL FACILITY ORDERS HAVE THE LARGEST OVERRUNS.

Average Percent Overruns* by Type of Order



Source: Analysis of completed and active orders in 60-case sample.

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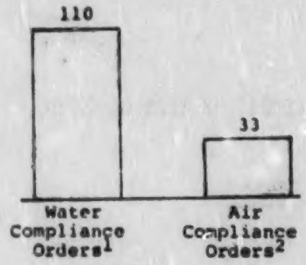
* Average of per case percent overruns for all orders of each type.

** This figure excludes one extremely delayed case from the sample. If this 1200% overrun is included the average would become 424%.

WATER COMPLIANCE ORDERS EXPERIENCE MORE THAN THREE TIMES THE PERCENTAGE OVERRUNS THAT AIR ORDERS DO.

Percent Overruns in the Average Order
(in percent of scheduled time*)



Source: 1) Analysis of completed and active orders in the 60-case Water Compliance order sample;
2) "Baseline Profile of Air Compliance Unit".

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* Water Orders also allow more scheduled time per case than Air Orders do.

DISCUSSION: Enforcement problems are almost always caused by the few worst cases. In the Air Compliance area, 13 percent of those under order are responsible for three quarters of all delay. Any enforcement system must be both tight enough to be effective against the recalcitrant few and, at the same time, designed not to be unduly burdensome to those who comply voluntarily or who will do so if they know others are obeying the law and that there is some risk in not doing so.

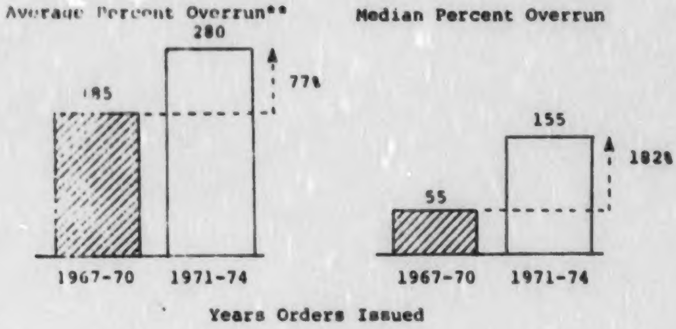
The fact that the Air unit has significantly less delay overall, and the fact that it has a higher proportion of overall delay concentrated in a smaller number of its worst, most recalcitrant cases, suggests that increased enforcement effort by the Water Compliance Unit probably could reduce compliance delay significantly, especially among the bulk of cases that are not "hard-core" recalcitrants.

The enforcement experience of the Air and Water Units are not entirely comparable. The Water Compliance Unit has fewer resources it can allocate per case. Whereas the Air Unit typically spends five months negotiating the terms of an order with the regulatee before the order is issued, until recently the Water Unit has issued its orders without prior negotiation and has, by consequence, tended to lose the time required for talking with the regulatee during the time allocated to the first planning step. Finally, Water Compliance engineers report that the engineering required to design and install water pollution control systems is generally more complex than for air emissions controls, a belief reflected in the longer scheduled time allowed in Water Compliance orders. Consequently, even though the regulatees are often the same, one should not exaggerate the importance of the Air/Water contrast. Nevertheless, the nature and extent of the difference between the two, provides an additional indication that Water Compliance delays could be cut significantly.

I - Orders: Cutting Delay

PERCENT OVERRUNS HAVE INCREASED SHARPLY SINCE 1967-70.

The Change in Percent Overrun from 1967-70 to 1971-74*
(in percent of scheduled time)



Source: Completed and active orders in sample of 60 cases.

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* Percent overrun is calculated as the overrun divided by the scheduled time for each order issued in the four-year time period.

** Average percent overrun is the average per case overrun for orders issued in the given time period.

CURRENT RESPONSES TO DELAY

The Department now has three responses to delay: (1) tabling, (2) modification (usually extension) of the order, and (3) going to court through referral to the Attorney General.

Tabling, the alternative with lowest cost to the Department, is a convenient response to delay in the substantial proportion of cases in which neither modification nor referral are appropriate --when new dates for a modified timetable are not yet definable and referral is not warranted.

The Department approves extensions or other modifications to orders only when reasonable new compliance dates have been determined for an order in which progress is evident and for which the current timetable is no longer adequate. Need for modification may arise, for instance, (1) when unavoidable circumstances have delayed efforts to comply, (2) after an engineering study has shown that the work necessary to control pollution is other than originally thought, and (3) when long avoidable delays have rendered the existing timetable obsolete by the time the regulatee resumes progress towards compliance.

The Department may refer a case to the Attorney General for injunction or forfeiture if the regulatee is clearly responsible for the delay. The unit has preferred to defer referral and to depend on persuasion at least as long as the regulatee seems willing to move forward, because, if the initial warning from the AG does not work, future progress with the case will depend on slow and uncertain court proceedings. To date the courts have issued only one injunction (to a private homeowner) and no forfeitures for water compliance violations.

Tabling/jawboning is the Department's only currently available response to deliberate/avoidable delay short of invoking the slow and unsatisfactory court process or legitimizing the delay by modification of the order schedule. The Department has not had an effective incentive to apply to delinquent dischargers.

This subsection reviews the responses to delay currently available to the Department:

- Over half the orders issued since 1967 have been tabled, 44 percent extended, and 16 percent referred to the Attorney General.
- The average order is tabled or late with no action for 8.5 months, extended for 3.9 months, and is in the AG's office for 3.3 months.

- **Over half the Water Compliance Unit's cumulative overrun was handled by tabling.**

- **The average tabling lasts for 7.2 months, the average extension for 2.6 months.**

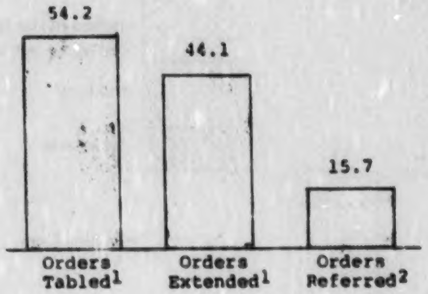
- **The average referral to the AG stays in his office for 18.1 months.**

- **The mix of responses has varied considerably from year to year.**

I - Orders: Responses to Delay

OVER HALF OF ALL ORDERS ISSUED SINCE 1967 HAVE BEEN TABLED AT LEAST ONCE, 44 PERCENT HAVE BEEN EXTENDED, AND 16 PERCENT REFERRED TO THE ATTORNEY GENERAL.

Percent of All Orders Issued Since 1967

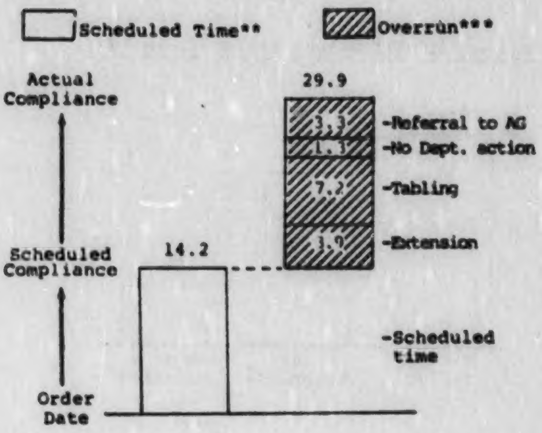


Source: 1) Sample of 60 orders issued 1967-1974.
2) "Status of Actions Referred to the Office of the Attorney General", a list compiled by the Office of the Attorney General.

I - Orders: Responses to Delay

THE AVERAGE ORDER IS TABLED OR LATE WITH NO ACTION FOR 8.5 MONTHS, EXTENDED FOR 3.9 MONTHS, AND IS IN THE ATTORNEY GENERAL'S OFFICE FOR 3.3 MONTHS.

Department Response to Delay in Average Case*
(in months)



Source: Analysis of completed or active orders in 60-case sample.

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* Scheduled and actual times are averages for only those steps completed or pending.

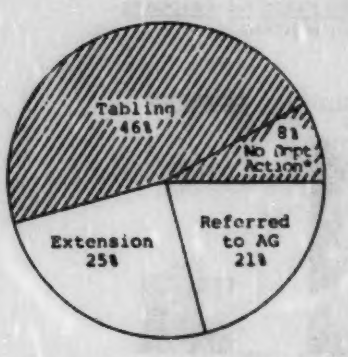
** Scheduled time for final compliance in the average order is 17.0 months. The scheduled time here is less since those steps for which the previous step is not complete have been excluded from the average.

*** The average overrun is more than the 15.7 months indicated here because steps still pending continue to log time past their scheduled date prior to compliance.

I - Orders: Responses to Delay

MORE THAN HALF OF THE TOTAL AVERAGE OVERRUN OCCURS WHILE AN ORDER IS TABLED OR AWAITING DEPARTMENT ACTION.

Proportion of Total Overrun Handled by Available Responses



Source: Analysis of completed and active orders in 60-case sample.

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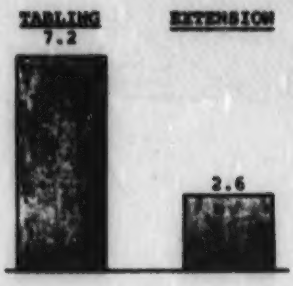
* Periods of non-action rarely extend more than one or two months beyond a scheduled deadline.

I - Orders: Responses to Delay

THE AVERAGE TABLING LASTS FOR 7.2 MONTHS, THE AVERAGE EXTENSION FOR 2.6 MONTHS.

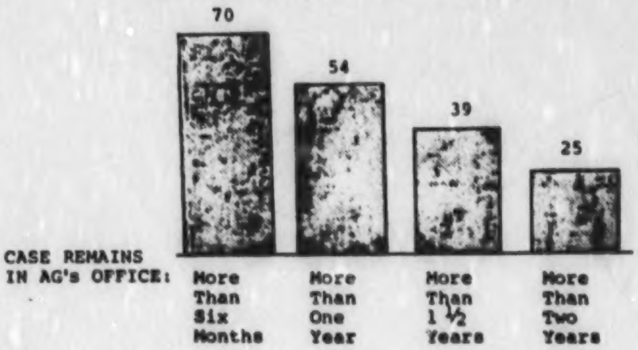
Average Duration of Response
(in months)



Source: Analysis of completed or active orders in 60-case sample.

I - Orders: Responses to Delay

ORDERS REFERRED TO THE ATTORNEY GENERAL REMAIN AN AVERAGE OF 18.1 MONTHS UNTIL WITHDRAWN OR REVOKED. OVER HALF REMAIN IN THE ATTORNEY GENERAL'S OFFICE MORE THAN ONE YEAR AND ONE-FOURTH REMAIN MORE THAN TWO YEARS.


Duration of Referrals to the Attorney General
(percent of all orders referred)

Source: "Status of Actions Referred to the Office of the Attorney General".

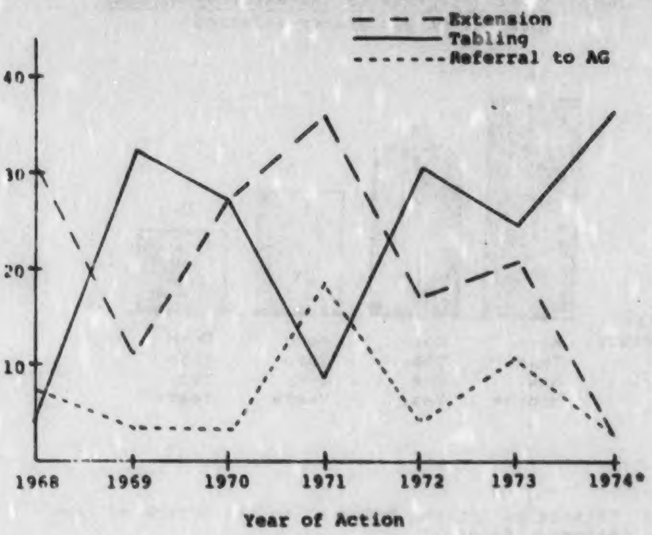
NOTE: THESE FIGURES DO NOT INCLUDE CASES NOT YET REMOVED FROM THE AG's OFFICE. IN OTHER WORDS, THE WORST CASES WITH THE LONGEST DELAYS ARE NOT INCLUDED -- THEREBY UNDERSTATING TYPICAL DELAY IN THE AG's OFFICE SIGNIFICANTLY.

DISCUSSION: The Attorney General is able to get good response from a large number of delinquent dischargers merely by writing them a letter threatening legal action. For those who do not respond to this bluff, however, the Attorney General enters into negotiations and ultimately may go to court. The court process is uncertain: to date there have been no forfeitures and one injunction (to a private homeowner) imposed on recalcitrant dischargers. The court process is, however, almost certainly very slow. The average referral takes over a year and half, and the average takes into account the large number of cases that respond quickly to their first warning from the Attorney General's office. This long delay is one of the key reasons cited by virtually all engineers interviewed for their reluctance to refer cases.

I- Orders: Responses to Delay

THE PERCENTAGE OF OUTSTANDING ORDERS PROCESSED THROUGH EACH OF THESE RESPONSES TO DELAY VARIES GREATLY FROM YEAR TO YEAR.

Percent of Outstanding Orders Referred, Extended & Tabled per Year



Source: Analysis of completed and actual orders in 60-case sample.

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* Many orders were tabled in 1974 while the unit processed NPDES permits to supercede the old orders. In addition, the unit relied heavily on the tabling device to ease the staff burden occasioned by the NPDES permit processing load.

DISCUSSION: The variable use of each of the responses to delay reflects changes in administrative policy. In recent years the increased work load and staff shortage has led to greater reliance on the tabling device due in part to its low administrative cost.

ADMINISTRATIVE COSTS

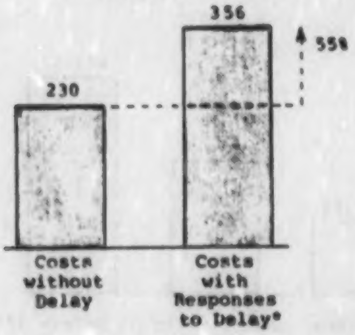
Under existing circumstances

- The administrative cost of processing the average case is increased more than 50 percent by the extensive delay encountered.
- Granting extensions is almost twice as expensive to process as tabling.

I - Orders: Administrative Costs

THE COSTS OF RESPONDING TO DELAY INCREASE THE ADMINISTRATIVE COSTS OF PROCESSING THE AVERAGE CASE OVER 50 PERCENT.

Administration Costs of Processing the Average Case
(in dollars)



Source: Analyses of sample of 60 orders issued 1967-1974; Interviews with Water Compliance Unit engineers.

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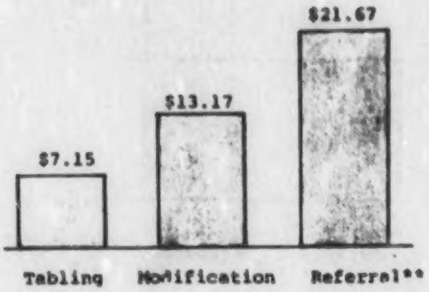
* The administrative costs for responses to delay include the costs to the Department of processing an average of 1.2 extensions, .95 tablings, and .24 AG referrals per order. These processing costs include added field inspections, meetings, etc., occasioned by the delay.

I - Orders: Administrative Costs

IT IS ALMOST TWICE AS EXPENSIVE TO PROCESS AN EXTENSION AS IT IS TO TABLE THE SAME DELAY.

Administrative Costs to the DEP of
"Alternative Responsed to Delay"*
(Average Case)



Source: Analyses of sample of 60 orders issued 1967-74; Interviews with Water Compliance Unit engineers.

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* These costs do not include preparatory field inspections, communications with the regulatee, and other similar costs. Extensions are likely to entail more expenses of this type than tabling in order for the Department to determine what specific adjustments should be made in the new order.

** This cost does not include costs to the Office of the Attorney General of to the Courts.

CHAPTER II

PERMITS FOR NEW DISCHARGES

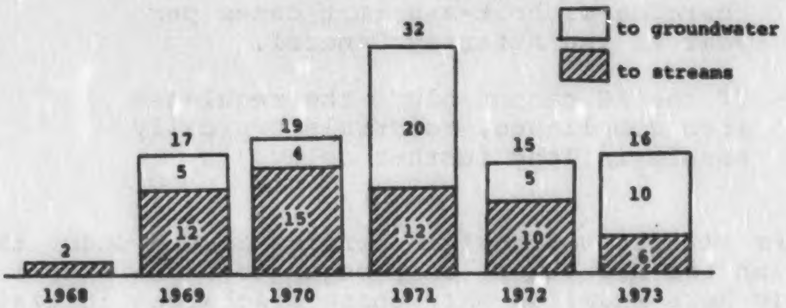
All new or significantly modified discharges initiated after 1967 must apply for and obtain a permit prior to beginning the discharge. Chapter II reviews the history of this program.

- The Department has issued roughly 20 permits a year.
- It has referred an average of 9 discharging-without-a-permit cases per year to the Attorney General.
- If the AG cannot bluff the regulatee into compliance, referrals typically result in long further delay.

Chapter II does not analyze permits issued under the NPDES program which the Department only began to administer in 1974. The analysis here examines only those discharges initiated or approved as of the end of 1973. Through the new NPDES permit program the Department can regulate existing (pre-1967) as well as new discharges.

THE DEPARTMENT HAS ISSUED ROUGHLY 20 NEW DISCHARGE PERMITS A YEAR -- 55 PERCENT FOR STREAM DISCHARGES, 45 PERCENT FOR GROUNDWATER DISCHARGES.

Number of New Discharge Permits Issued per Year



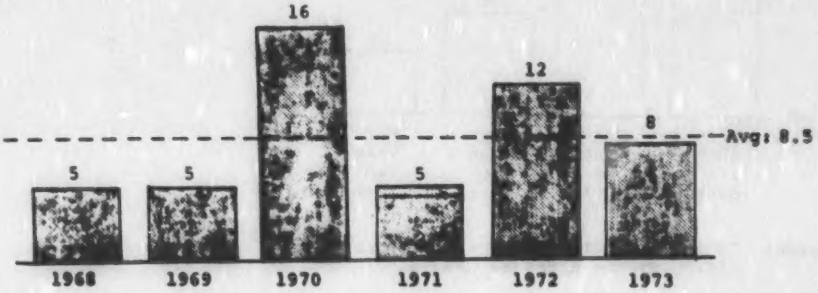
Source: Water Compliance list of all new discharge permits.

DISCUSSION: Because issuing new discharge permits necessitates a public hearing and other costly administrative procedures, the Department has required permits only for industrial and major sanitary discharges.

II - Permits

THE DEPARTMENT HAS REFERRED AN AVERAGE OF 8.5 DISCHARGING-WITHOUT-A-PERMIT CASES TO THE ATTORNEY GENERAL ANNUALLY.

Annual Number of Referrals for Discharging Without a Permit

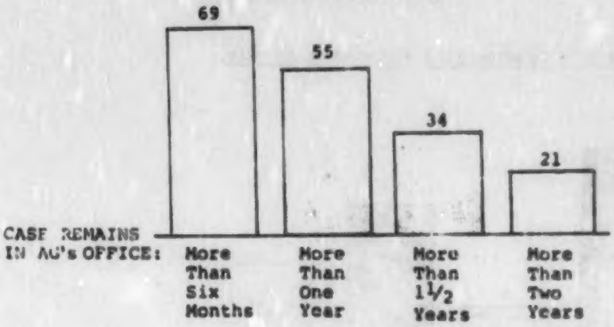


Source: "Status of Actions Referred to the Office of the Attorney General".

IF THE AG CANNOT BLUFF OR NEGOTIATE VOLUNTARY COMPLIANCE, SUBSEQUENT RELIANCE ON COURT PROCESSES LEAD TO LONG ADDITIONAL DELAYS.

OF CASES WITHDRAWN⁺ FROM THE AG, OVER HALF WERE IN HIS OFFICE OVER ONE YEAR.

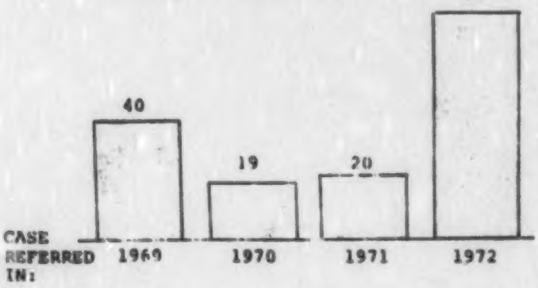
Duration of Completed Referrals to the AG
(Percent of Referrals)



Source: "Status of Actions Referred to the Office of the Attorney General".

THREE-QUARTERS OF ALL CASES REFERRED TO THE AG IN 1972 WERE STILL THERE IN AUGUST 1974.

Percent of All Cases Referred to the AG still Pending in August, 1974



Source: "Status of Actions Referred to the Office of the Attorney General".

+ Cases are withdrawn after either elimination of the discharge or approval of a permit. Because it does not include data from cases that remain unresolved, this chart understates the duration of referrals to the Attorney General.

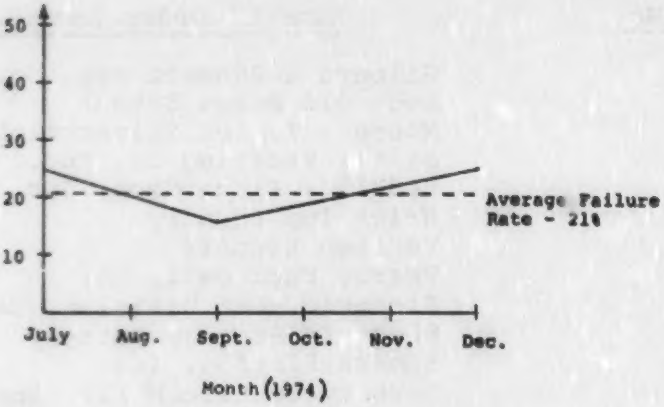
CHAPTER III

MONITORING REPORTS REQUIRED FOR NPDES PERMITS

The recently-instituted NPDES program for stream discharges requires the periodic submission of monitoring reports containing the results of sampling analyses for the permitted discharges. Permits may require measurement of the flow volume, pH, temperature, and effluent waste concentrations.

IN A SAMPLE OF 20 PERMITS WHICH HAD REQUIRED SUBMISSION OF MONITORING DATA FOR AT LEAST SIX MONTHS AS OF DECEMBER, 1974, 21% OF THE REPORTS WERE NOT SUBMITTED.

Percent of Monitoring Reports Not Submitted



Source: NPDES Monitoring Files.

APPENDIX

SAMPLE OF 60 PRIVATE AND INDUSTRIAL ORDERS

The sample was selected from the list of all orders issued from 1967 to mid-1974. The sample includes every non-municipal order with a number divisible by 20, or the first order thereafter, from #120 to #1300.

Key to Order Type

A: Connect to Municipal Sewage System
B. Install New or Modified Sanitary Waste Facility
C: Install New or Supplemental Industrial Waste Facility
D: Improve Industrial Waste Handling - Miscellaneous Directives
E: Examine and Modify Structural Integrity of Oil Distribution Facility

Order No.	Name of Order Recipient	Type of Order
120	Gilbert & Bennett Mfg. Co.	D
140	Avon Old Farms School	B
160	Moore & Taylor Silversmiths	C
180	Sirtex Printing Co, Inc.	B
200	DeBell & Richardson, Inc.	C
220	Brick Top Laundry	A
240	Puritan Laundry	A
260	Pharos Farm Dairy Co.	C
280	Electric Boat Division, General Dynamics	A
300	Electric Storage Battery	C
320	Somers Plating, Inc.	C
340	Novelty Textile Mills, Inc.	A
360	G. N. Papers, Inc.	A
380	Torrington Company	C
400	The Montgomery Co.	C
420	Star Pin Company	C
440	Lockheed Aluminum Window Corp.	A
460	Screw and Bolt Corp. of America	C
481	Colchester Egg Farms	B
500	Sunshine Laundry	A
520	Nestle Company	C
540	Norwalk Asphalt	C
560	Fairfield Processing Corp.	A
580	Accurate Chrome, Inc.	C
600	Willington Name Plate, Inc.	B
620	New England Motors, Inc.	A
641	Jacobs Manufacturing	C
660	Riverview Apartments	A
682	Westfall-Chafee Laminates, Inc.	A
700	Benrus Watch Company, Inc.	D
720	Idle-Wilde Farm, Inc.	B
740	Minit Auto Care Co.	A
760	Vincent Buoncare & Sons	C

Order No.	Name of Regulatee	Type of Order
780	Car Washes, Inc.	A
800	Dainty Maid, Inc.	B
820	Federal Paper Board Co., Inc.	C
840	Superior Steel Ball Co.	C
860	Gedney Electric Co.	C
882	Connecticut Sand & Stone Corp.	C
900	Electrotherm Wire Company	C
920	Mayflower Truck Station, Inc.	D
940	W&S Surgical Instrument Corp.	C
960	Raybestos-Manhattan, Inc.	C
982	New Canaan Water Co.	C
1001	Bryant Electric Co.	C
1020	John Ahlbin & Sons, Inc.	C
1040	Rediflow	E
1060	Colonial Board	C
1081	Holiday Inn of Norwalk	B
1100	Julius Rytman	E
1120	Lincoln Oil Co.	C
1140	Idle-Wilde Farm, Inc.	C
1160	Revere Corp. of America	C
1180	New Haven Oil Terminal, Inc.	E
1200	TAD Jones & Company	E
1225	United Tool & Die	C
1240	American Oil Company	E
1263	John H. Caruso & Caruso Bros., Inc.	D
1280	Warner Murphy	C
1328	Milford Rivet & Machine Co.	C

PART III

CALCULATING ECONOMIC REMEDIES

CHAPTER I

CALCULATING ASSESSMENTS

Economic remedies must be just large enough to make compliance economically attractive: they must take away the entire benefit of noncompliance -- including whatever return the noncomplying person may be able to earn with the money it has not spent on pollution control for however long the delay continues. Such economic assessments should ensure voluntary compliance because they simultaneously remove the incentive to delay and guarantee those who do comply a commercially attractive "return" on their abatement investments -- not having to pay the assessments. This "return" will be sufficiently attractive to make citizens feel that compliance "pays" because it is calculated at the cost of capital rate appropriate for the source, i.e. because it is as large as the returns the source is obtaining on investments it has recently chosen to make.

An economic assessment is defined to be that payment which would, if made at the end of each month throughout a specified assessment period, have the same net economic impact on a source as the expenditures necessary for compliance with Department requirements throughout that assessment period. In other words, the present value of the stream of assessment payments made over the assessment period would equal the present value of the net flow of compliance costs over the same period.

Economic assessments are based on a simple economic calculus that is commonly used by businessmen in evaluating investment alternatives. This calculus requires four main steps;

(1) Identify the gross cash flow of all expenditures necessary for the source to comply with the law during each year of the assessment period and adjust for anticipated inflation (deflation). Both initial and replacement installed capital costs and operating and maintenance expenses must be considered.

(2) Obtain the net cash flow by adjusting the figures in (1) for the effect of tax deductions, chiefly for depreciation of capital equipment and deduction of operating and maintenance expenses and for the effect of a credit for the purchase of pollution control equipment.

(3) Discount this net cash flow to a present value (using a cost of capital rate if the source is a business and other appropriate rates if the source is a municipality or individual).

(4) Calculate the equal monthly payments that will spread out the present value from (3) over the entire assessment period using a standard amortization formula and a discount rate equal to the cost of capital rate used in (3).

The rest of this chapter outlines the methodology of these calculations in greater detail. It explains what information is needed to calculate an assessment, how the impact of taxes is taken into account, how the calculations are handled by the assessment formula, and how the formula is derived. It then explains (1) how the assessment formula was used to establish the schedules of maximum civil assessments found in the regulations, and (2) how it is used to calculate individual assessments.

DETERMINING THE COSTS OF COMPLIANCE CASH FLOW

The first step in determining the proper amount of an economic assessment is to identify what costs will be incurred in each year of the period during which control activities can be presumed to continue. (How these costs are determined, the most difficult step in making individual assessments, is explained briefly in Chapter II of this Part and, in detail, in Chapter VII of Part V.) These costs, and the way they will be handled in the assessment formula, are outlined below briefly:

(1) Initial installed capital costs for pollution control equipment facilities considered as an expenditure in year zero.*

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* It is assumed that all initial capital expenditures would have to be made in one lump at the beginning of the assessment period. In fact such expenditures would generally be made over a period of time. For instance, to comply with an order or qualify for a permit, a regulatee might have to pay $5,000 for an engineering report in March, $5,000 for detailed plans in May, $50,000 for equipment and contractor services in July, $50,000 for equipment in September, and $15,000 for contractor services at completion of the project in November. If the regulatee did not make any expenditures and was assessed a penalty at the final compliance date, the assessment period would begin in December. For assessment purposes it would be assumed that the entire $125,000 expenditure should have been made in November. This may seem to benefit the regulatee by letting him keep the benefit of use of much of these funds for a number of months. This is not true, because he will be charged the full monthly assessment until he has made all the requisite expenditures, even though some expenditures will have been made many months in advance of final compliance.

(2) Replacement costs for this abatement equipment. It is assumed that the equipment will be replaced at the end of each depreciation period within the assessment period and that the cost will be the cost of the initial equipment increased (or decreased) by inflation (or deflation) at a rate equal to the average rate for the preceding three years. (The assessment period is 20 years for reasons discussed below; in individual assessment cases it is presumed that equipment must be replaced every 15 years unless the Commissioner finds otherwise. The 15 year figure is based on EPA data on the typical life expectancy of water pollution control facilities.)

(3) The salvage value of any equipment is the extent that it is not fully depreciated at the end of the assessment period. This factor is, of course, a credit that reduces the net cost. Salvage value is also adjusted for inflation (deflation).

(4) The annual operating and maintenance costs that are required to ensure the continuous effective operation of the pollution abatement facilities over their full depreciable life. These costs are increased (decreased) each year to account for inflation (deflation).

All of these expenses are affected significantly by various tax provisions. The assessment formula takes into account the effects on a source's U. S. income tax of:

(1) An investment tax credit for the purchase of new abatement facilities.

(2) Deductions from taxable income each year of:

    (a) Depreciation on the capital cost of these facilities over their useful life (or at accelerated rates when this is approved), and

    (b) Annual operating and maintenance costs.

In developing assessments from the net cash flow of the costs of compliance created from these cost estimates and tax considerations, the following assumptions apply:

* Tax savings are calculated as if the violator is in a tax bracket with a known effective rate (the variable T in the assessment formula) in all years.

- Regulatees either have or will have sufficient taxable income to take full advantage of any tax credits or deductions to which they are entitled by virtue of required control expenditures, or their effective U. S. income tax rate (T) will be 0. (See Chapter 5)

- An investment tax credit is in effect, and is obtained at the time equipment is purchased.

- For purposes of discounting, operating costs are considered to be paid and corresponding tax savings realized at the beginning of each year. Tax savings from depreciation are realized at the end of each year. *

- If equipment is not fully depreciated at the end of the assessment period, it can be sold at a salvage value equal to its economic worth. In that case a portion of the tax credit must be refunded, pro-rated according to the proportion of useful life remaining. (The formula for salvage value is given in the derivations section below.)

- For the purposes of calculating the depreciation tax deduction in case-by-case assessments, five year accelerated depreciation is used. This depreciation formula is approved by the IRS and is nearly universally used. For purposes of determining the intervals between replacements of equipment and the salvage value of equipment, it is assumed that the equipment is not fully depreciated until the end of its expected life (15 years unless the Commissioner determines otherwise).

THE ASSESSMENT FORMULA

While the assessment formula takes into account a wide variety of interacting variables, Department staff do not have to push their way through a host of calculations to determine the effects of these

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* Operating costs are, in fact, paid throughout the year. This might argue for considering them to be paid at mid-year. However, the formula is greatly simplified by assuming they are paid at the beginning or end of the year. The beginning rather than the end of the year was chosen in part because doing so ensured that the resulting assessments will be high enough to take away the full economic benefits of noncompliance regardless of when during the year a violator pays its operating expenses.

interactions in each case. The assessment formula has been programmed for use on a Wang desk-top calculator. All that is required of those calculating the assessment is determination of the cost of compliance and a few additional, easily identified variables. Once this is done, a tape cassette with the assessment formula on it is put in the calculator, the values for the variables are punched in, and the "Go" button pushed. The calculator types out the assessment a few seconds later.*

This section explains the formula and its derivation.

Notation

Input variables:

AP = Assessment period in years.

CC = Annual cost of capital or discount rate, as a decimal fraction.

EL = Expected life of control equipment**, in years.

DL = Depreciable life (for tax purposes) of equipment, in years.

CCE = Capital costs of control facility equipment** for initial equipment, in dollars.

OP = Operating costs in first year, in dollars.

RI = Annual rate of inflation, as a decimal fraction.

T = Effective marginal corporate income tax rate, as a decimal fraction. (If there is a state corporate income tax, T would be the total effective tax rate. It would be given by the formula:

$T = T_s + (1 - T_s)\, T_f$, where T_s is the state corporate income tax rate and T_f the federal one).

TC = Investment tax credit rate, as a decimal fraction.

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* Mr. Phil Florkoski of the Air Compliance Engineering staff has programmed these formulae and has a library of the tapes.

** The expected life and capital cost figures cover everything included under facility costs in §§502 and 503. The term equipment is used because that term is used in the already effective Air regulations for the same class of cost items. If the term facility were used here, the notation would have to be changed and there would have to be unnecessary duplication of assessment formula programs, etc., since with the exception of this terminology, they are almost the same.

Output variable:

CA = Civil assessment per month, in dollars.

Other variables:

PVO = Net present value of operating and maintenance costs over assessment period, net of any tax savings arising from these costs.

PVIE = Net present value of initial equipment, net of any tax credits and savings arising from the purchase and depreciation of this equipment.

PVE = Net present value of equipment cost over the entire assessment period. (Includes discounted value of initial and replacement equipment, less the value of tax credits and deductions and of any salvage value at the end of the assessment period.)

A = The amortization factor, giving the amount of the monthly payment required per dollar of present value to b amortized. This converts the present value of a stream of facility and operating costs that in fact occur unevenly over the assessment period into equal monthly payments that have exactly the same overall economic impact.

Formula

The civil assessment is given by formula (1) below, with the additional variables defined by equations (2) through (5). (These formulae are derived in the following section.)

$$CA = (PVO + PVE)\ A \qquad (1)$$

$$PVO = (1-T)\left(\frac{1 + CC}{CC - RI}\right)\left(1 - \left(\frac{1 + RI}{1 + CC}\right)^{AP}\right) OP \qquad (2)$$

$$PVIE = \left[(1-TC) - \frac{T}{(DL)\,(CC)}\left(1 - \frac{1}{(1 + CC)^{DL}}\right)\right] CCE \qquad (3)$$

$$PVE = \left[\frac{1 - \left(\frac{1 + RI}{1 + CC}\right)^{AP}}{1 - \left(\frac{1 + RI}{1 + CC}\right)^{EL}}\right] PVIE \qquad (4)$$

$$A = \frac{(1 + CC)^{(1/12)} - 1}{1 - \dfrac{1}{(1 + CC)^{AP}}} \qquad (5)$$

Derivations

CA:

The total present value of compliance costs is the sum of PVO and PVE. The economic assessment is the monthly payment which amortizes this sum over AP years. Hence, the sum is multiplied by the amoritzation factor A.

PVO:

We assume that operating costs are paid in the beginning of the year. Each year operating costs increase by an inflation factor of (1 + RI), regardless of the age of equipment then in use. We convert operating costs for year I-1 to present value by discounting by the factor 1/ (I + CC). Assuming T is the current maximum rate of .48, there is a tax savings of 48 percent of operating costs each year, so net operating costs are .52 of gross operating costs each year. In general,

$$PVO = \sum_{I=1}^{AP} \left[(1-T)(OP)\ (1+RI)^{I-1} \right] \left[\frac{1}{(1+CC)^{I-1}} \right]$$

Formula (2) above is an equivalent but more explicit formula, derived from the sum of a geometric series.

PVIE:

The cost of initial equipment is CCE. Deducted from this is the tax credit (the variable TC) obtained immediately, and tax savings of the fraction T of allowable depreciation for each year of depreciable life of the equipment. In calculating the maximum assessments that are published in the regulations, straight-line depreciation is assumed. Using straight-line depreciation, annual depreciation is CCE/DL. Depreciation in annual year I is discounted by the factor 1/ $(1+CC)^I$. Thus

$$PVIE = CCE - (TC)\ (CCE) - \sum_{I=1}^{DL} (T) \left(\frac{CCE}{DL}\right) \frac{1}{(1+CC)^I}$$

Formula (3) above is equivalent.

PVE:

The equipment cost of the K^{tn} set of replacement equipment (where K = 0 for initial equipment) is equal to the purchase price of the initial equipment times a cumulative inflation factor of (1 + RI) K x EL.

The savings due to the tax credit on replacement equipment and to deductions for depreciation are proportional to facility cost, and are thus also inflated by the same cumulative inflation factor. Note that all expenditure and savings on this piece of replacement equipment occur (EL) x (K) years further in the future than the corresponding cash flows for the initial equipment purchase. Provided that the entire useful life of the K^{th} replacement equipment lies within the assessment period, its contribution to net present value is

$$\left(\frac{1 + RI}{1 + CC}\right)^{(EL)(K)} \left(PVIE\right)$$

If the assessment period AP is an integral multiple of the equipment life EL, then the useful life of all replacement equipment will be within the assessment period. In that case,

$$PVE = \sum_{K=0}^{(AP/EL)\ -1} \left(\frac{1 + RI}{1 + CC}\right)^{(EL)(K)} \left(PVIE\right)$$

Formula (4) is the equivalent but simpler summation of this formula.

If AP is not an integral multiple of EL, then the last piece of replacement equipment still has a salvage value at the end of the assessment period. The salvage value is equal to the remaining unused economic value of the equipment. If the equipment was purchased in year J and there are only X years remaining in the assessment period (where I is less than EL), its salvage value is

$$CCE\ (1 + RI)^{J} \left[\left(\frac{1- \left(\frac{1 + RI}{1 + CC}\right)^{I}}{1- \left(\frac{1 + RI}{1 + CC}\right)^{EL}}\right) (1-TC) + \frac{I}{EL}\ (TC)\right]$$

This salvage value is such that the net present value of equipment costs over any period does not depend on what combination of new and used equipment is owned during that period. As a result, equation (4) for PVE holds regardless of whether AP is an integral multiple of EL.

A:

The amortization factor is based on the standard formula for a monthly annuity of unit amount for AP years at an annual interest rate of CC. Since the formula is for monthly payments, the numerator is the monthly cost of capital.

DETERMINING MAXIMUM ASSESSMENTS

For purposes of calculating maximum assessments, the values used are at or near the most extreme likely value for the variable in the direction that will result in higher assessments. This is to make certain that these maxima will not preclude the Department from levying assessments large enough to take away the entire economic benefit of O&M violations. Individual assessments will use actual data and, as a result, almost always be much smaller than these maxima. The maxima assume the following values: (Note that CA increases with increases in CCE, OP, RI, CC and AP, and decreases with increases in EL, T and TC.)

- RI = .15 (i.e., 15%). The typical rate of inflation has increased markedly over the last several decades and reached levels not far from 15 percent in 1974.
- CC = .20 (i.e., 20%). Over the long run, the cost of capital has generally exceeded the inflation rate by about 5 percent to provide an adequate return and to compensate investors for inflation.
- AP = 20 years. Twenty years is a common time frame for evaluating many capital projects. Since abatement facilities are auxiliary to production facilities, such facilities and their replacements will have to be used for the lifetime of the underlying plant requiring control, if the source is to remain in compliance with the law. Consequently it is reasonable to assume that sources evaluating a commitment to abatement will think in terms of the common 20-year period. Moreover, a common assessment period helps ensure that assessments are comparable and therefore fair.
- EL = 5 years. Very few significant types of water pollution control equipment have useful lives less than five years long.
- DL = 5 years. Federal Tax law permits that pollution abatement equipment be depreciated over a five year period, or over the expected lifetime of the equipment, whichever is shorter.
- T = 0. Most businesses assessed will have a 48 percent tax rate, but a few major sources of pollution may have a 0 tax rate. Thus, to avoid the risk that the maximum will be too low for some problem cases, a 0 rate is used in the maximum. In the absence of evidence that a different rate applies, the 48 percent rate will be used with individual cases involving industrial sources.
- TC = 0. The current rate of the U.S. investment tax credit is 10 percent. However, since the few companies that pay no tax would get no benefit from the tax credit, a 0 rate is used for the calculation of maxima so as to be sure to encompass the economic benefits of such firms.
- CCE, OP - maximum figure in range. To obtain the maximum assessment when CCE and OP may assume any value over a specified range, CCE and OP are set at the upper limits of their respective ranges.

An Example: Derivation of a Maximum Assessment

The following computations illustrate the calculation of the civil assessment for the upper left cell in the schedule of maxima in §503(d) of the Water Compliance Civil Assessment Regulations. (This cell is for cases with facility cost, CCE = $2500 and annual operating cost, OP = $1000. Other input variables are set at the values specified above.)

$$PVO = 1 \left(\frac{1 + .20}{.20 - .15}\right) \left(1 - \left(\frac{1 + .15}{1 + .20}\right)^{20}\right) 1000 = 13{,}754.26 \qquad \left[\text{by } (2)\right]$$

$$PVIE = \left[1 - \frac{0}{5(.20)} \left(1 - \frac{1}{(1 + .20)^{5}}\right)\right] 2500 = 2500 \qquad \left[\text{by } (3)\right]$$

$$PVE = \left[\frac{1 - \left(\frac{1 + .15}{1 + .20}\right)^{20}}{1 - \left(\frac{1 + .15}{1 + .20}\right)^{5}}\right] (2500.00) = 7474.60 \qquad \left[\text{by } (4)\right]$$

$$A = \frac{(1 + .20)^{(1/12)} - 1}{1 - \frac{1}{(1+20)^{20}}} = .015719 \qquad \left[\text{by } (5)\right]$$

$$CA = (13754.26 + 7474.60)\ .015719 = 333.70 \qquad \left[\text{by } (1)\right]$$

For this example the civil assessment would be $333.70 for each month in which the polluter failed to comply with emissions standards.

SETTING INDIVIDUAL ASSESSMENTS

Individual assessments are determined using the same economics and assessment formula as were used to fix the maximum assessment schedules. However, the Department will utilize current, real values for CCE, OP, EL, DL, RI, T, TC, and CC.

- Equipment Costs (CCE) will be based on Department estimates of the installed equipment costs required to bring an uncontrolled source into compliance or on evidence of the actual cost. (See Chapter II.)

- Operating and Maintenance Expenses (OP) will be based on Department estimates of the annual cost of operating and maintaining this equipment properly. (See Chapter II.)

- Equipment Life (EL) is 15 years unless the Commissioner determines otherwise initially or in a correction hearing. He will use reliable tables from, e.g. the U.S. EPA and/or IRS, in making any such adjustments.

- Depreciable Life (DL) is 5 years unless Federal Tax law changes or unless the Commissioner determines that the lifetime of a particular piece of equipment (and therefore its depreciable life) is less than five years.

- The Rate of Inflation (Deflation) (RI) will be valued as the average of the last three years' annual rates based on an appropriate price index. (See Chapter III.)

- The U.S. Income Tax Rate (T) applicable to the source will be assumed to be 48 percent if the source is a corporation (with very limited exceptions) and zero percent if it is a public body or a nonprofit institution. The rate will vary if the source is an individual or partnership. (See Chapter IV.)

- The Investment Tax Credit (TC) will be the rate set in the current tax law. (It is now 10 percent.)

- The Cost of Capital (CC) will be set in most cases as the marginal rate obtaining in the industry at the time. (See Chapter V.)

The following chapters explain how to estimate installed capital and annual O&M costs, how to adjust for inflation, how to take different individual tax rates into account, and how to obtain the cost of capital so critical to the formula.

CHAPTER II

DETERMINING THE COST OF COMPLIANCE IN WATER COMPLIANCE SECTIONS 502 AND 503 ECONOMIC CIVIL ASSESSMENT CASES

The most important variables in the assessment calculation are the control facility costs and the annual expense of operating and maintaining the facility. To impose civil assessments at the appropriate level, the Department must be able to easily and accurately estimate both facility and operating costs. This chapter discusses the key issues in determining the cost of compliance and summarizes the methods by which such costing can be carried out.

THE COST OF COMPLIANCE IN DIFFERENT TYPES OF POLLUTION CONTROL CASES

The cost of compliance is broadly defined in both Sections 502 and 503 to include virtually all costs (minus all savings) that would be incurred by a permit applicant or order recipient in qualifying for the permit or in fully complying with the order. Such costs include both facility costs (including all expenditures which are capitalized and depreciated) and operating costs (including the continuing, non-depreciable expenses of operating and maintaining the facility). Facility costs are aggregated into a single lump sum, while operating costs are calculated as a continuing annual expense.

In all Section 502 cases and in the Section 503 cases that deal with violation of the terms of orders, the cost of compliance will include both facility and operating costs. However, in the few Section 503 cases that involve violation of the terms of permits (essentially failure to operate and maintain), only operating and maintenance costs will be included in the cost of compliance.

There are numerous types of pollution control problems which are regulated through order and permit procedures, e.g., treatment of industrial wastes, discharge of sanitary wastes to either municipal sewers or the groundwaters, and other point sources and control of siltration, erosion, and other run-off problems. Naturally, the cost of compliance with Departmental requirements varies significantly for different types of water pollution control problems. The costs in each individual case, even for similar types of problems, are highly idiosyncratic. The costs may vary in relation to the volume of the flow, the components of the discharge, and the required amount of effluent reduction/control for each particular source. In addition, numerous other factors can affect the costs in individual cases, e.g., the adaptability of existing equipment for treatment purposes; the availability of in-house labor for installation of treatment facilities; the layout of a plant; the availability of land for building, sludge handling, etc.; and the distance to a receiving stream, sewer or acceptable soil for septic-type treatment.

FACILITY COSTS

The items included in facility costs vary with the installation. For example:

* If installation or modification of a treatment, disposal, storage, or other facility is required, the facility costs include all equipment, instrumentation, materials, labor, contracting and engineering services, and other costs which must be incurred to construct a facility approved by the Department

* If implementation of measures to control siltation, erosion, or run-off, is required, the facility costs include the costs of all equipment, engineering and contracting services, structures, excavation, regrading, seeding, and any other site work necessary to meet the pollution control requirements of the Department.

* If a source is required to discharge to a municipal sewer, the facility costs include costs of excavation, piping, pumps, engineering and contracting services, and other capitalizable items required by the Department.

Costs Associated with Obtaining Interests in Land

The Department may want to ignore the cost of purchasing land for the purpose of treating water discharges, e.g. with a septic system or settling lagoons, in most cases. Since much land suitable for such use has intrinsic value, the bulk of such costs are not losses to the source. Probably all it is losing is the value of being able to use the property for financially more rewarding purposes. This relative use value will usually not be very large, but the cost of obtaining a defensible estimate may be large. When such estimates prove necessary, however, the Department's Land Acquisition Unit can help the Water Compliance staff due to its experience with land valuation.

Costs of easements, rights of way and short-term leases should be included in the cost of compliance if they are likely to be significant in amount. Some dischargers will have to obtain such interests in land in order to pipe their treated discharges to a stream or sewer. These limited interests are far less likely to have intrinsic value than ownership.

OPERATION AND MAINTENANCE COSTS

The operation and maintenance (O&M) cost component of the cost of compliance includes all expenses required to control or treat a source of pollution on a continuing basis in the manner required by the Department. Such control or treatment may be a stated condition in a permit or order or an implicit requirement for continuing Department approval of a specific discharge. Like the facility costs, the costs of operation and maintenance will vary significantly from case to case depending on the nature and location of the discharge, the techniques adopted for controlling pollution, and other factors. For example:

* For a treatment facility, the O&M costs include the costs of labor, chemicals, electricity, spare parts, sludge hauling, and other expense items required to operate the facility and maintain it in a state of continuous repair.

* For a municipal sewer connection, the O&M costs include all pumping costs, user charges and other expense items required to discharge into the sewer.

* For a siltation or run-off control structure, the O&M costs include all expenses required to ensure the effectiveness of the installation, such as costs of cleaning out holding basins.

CALCULATING THE COST OF COMPLIANCE

In order for the economic assessment approach to work properly, it is essential that each assessment be based on as complete and accurate estimates of the costs of compliance as can be obtained at reasonable administrative cost. If important cost items are left out, the assessments will be too small to eliminate all the economic incentive for non-compliance. If the cost of compliance figures are overstated, assessments will become vulnerable to legal attack on the grounds that they are punitive and therefore criminal, not civil assessments. Moreover, a systematic approach to costing assures fairness in enforcement by applying the same standard to all cases. The regulations provide for several costing techniques which ensure the requisite completeness and accuracy of information at acceptable administrative cost.

THE APPROACHES TO COSTING

For the purposes of calculating civil assessments, water pollution control systems will be costed in a variety of ways:

* from actual cost information submitted by regulatees and checked by the Department for completeness and accuracy

* from cost estimates submitted by the regulatee and checked by the Department for completeness and accuracy

* from cost curves that relate facility and/or operating costs to a few key variables of the discharge

* from cost information about similar installations obtained from Departmental records.

* from cost estimates based on control designs prepared by the Department.

The method used in a given case will depend in large part on the amount of cost information that is available from the regulatee. When it is available, the Department will use complete, accurate data on actual costs or estimated costs based on approved engineering reports or plans and specifications. Where such data is not available, the Department will rely on other estimating techniques.

The Use of Actual Cost Information

If purchase vouchers or other verifiable documentation of either the installed capital costs or operation and maintenance expenses are available in a particular case, the Department can calculate the cost of compliance directly from the submitted documents after checking the itemized costs for completeness and accuracy. An engineer familiar with the case can verify that all installed capital costs were accounted for by:

(1) comparing approved reports and plans with the itemized costs to ensure that all planned installations, modifications, etc. were included in the cost accounting, and

(2) relying on his knowledge of the work required and the work actually done to ensure that all costs were covered.

The operation and maintenance costs can also be checked:

(1) using itemized lists of anticipated expenses the Department might require sources to submit with engineering reports or plans and specifications, and

(2) relying on Department staff knowledge of the types of expenses usually incurred in operating and maintaining the type of pollution control facility in question.

These steps can be done rather quickly, especially after Water Compliance Unit engineers have gained some experience in performing these tasks. As the program progresses, engineers will be able to rely on cost data assembled from numerous cases handled by the Unit and from cost checks with suppliers.

The Use of Cost Estimates Submitted by Regulatees

Where a contractor's bid estimates the expected costs to be incurred in carrying out a Department-approved plan, the technique for determining the costs of compliance is similar to the method used when vouchers or actual costs are available. An engineer can check the submitted estimate for completeness and accuracy using information from manufacturers, suppliers, contractors, or consulting engineers, and information compiled by the Department on costs for similar installations or control activities. To allow for the possibility of under-estimation, the Department will add 10 percent to contractors' estimates, 20 percent to plans and specifications estimates, and 30 percent to engineering report estimates.*

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* Consulting engineers surveyed by CEP staff reported that contractor's bid estimates were accurate to ±10%, plans and specifications based estimates to ±20% and engineering report estimates to ±30%. See "Survey of Consulting Engineers," a CEP file memo available at the Connecticut State Library, Hartford, Conn., or from William Drayton, McKinsey & Co., 245 Park Avenue, New York, N.Y. 10017.

If cost estimates are incomplete or the reports or plans are not accompanied by cost data and that data cannot be obtained from the regulatee, the engineer will either cost out the approved system using available cost information or use one of the approaches for cases with no cost information that is discussed below.

The Use of Cost Curves

Cost curves provide an effective costing technique which minimizes administrative costs and offers a clear, concrete standard for use in large classes of cases. The curves themselves measure the relationship between facility and operating costs and a few key variables.

Costing with the curves is easy. The engineer must first determine the appropriate values for key variables, e.g.: *

a. the flow volume in gallons per minute of the cyanide rinses, the chrome rinses, and the total metal waste stream, and

b. the appropriate sludge dewatering mechanism. (This determination is made on the basis of the flow volume and the availability of land for a sand drying bed. If a sand drying bed is appropriate, the engineer will determine the number of different metals and the total concentration of metals in the waste stream.)

Information on the flow and content of the discharge is included in many "P-5" field inspection reports, and could, with a note on the availability of land, easily be included in all of them. Once this information is on hand, the engineer need only refer to the appropriate curves and tables to determine the facility costs. There are separate curves for "treatment modules" and "sludge dewatering."

Example: A metal finishing plant with an untreated 60 gpm flow containing both cyanide and chrome fails to submit an engineering report as required in an order to install a treatment facility. A set of curves and tables is available (see "Sources of Cost Information," below) which allows estimation of the installed costs of metal waste treatment facilities, both with and without cyanide and/or chrome treatment modules.

If in this particular case the cyanide rinse flow is 10 gpm and the chrome rinse flow is 5 gpm, the metal treatment cost curves estimate that the installed cost of the treatment facility minus the sludge dewatering device would be $212,200. If

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* Prototype curves for metal finishing waste treatment costs were developed by Water Compliance Unit and CEP staff. The following example involves the use of these curves.

sufficient land is available for a sand drying bed and if the total concentration of the four metals in the source's waste stream is 40 mg/liter, the installed costs of the sludge dewatering mechanism would be $13,820. Thus the total estimated installed cost for the metal waste treatment facility is $226,020.

The Treatment Module curves suggest the following detailed cost breakdowns:

Module	Flow Rate	Installed Cost
Cyanide Destruction	10 gpm	$ 69,850
Chrome Treatment	5 gpm	35,350
Neutralization/Settling	60 gpm	107,000
		$ 212,200

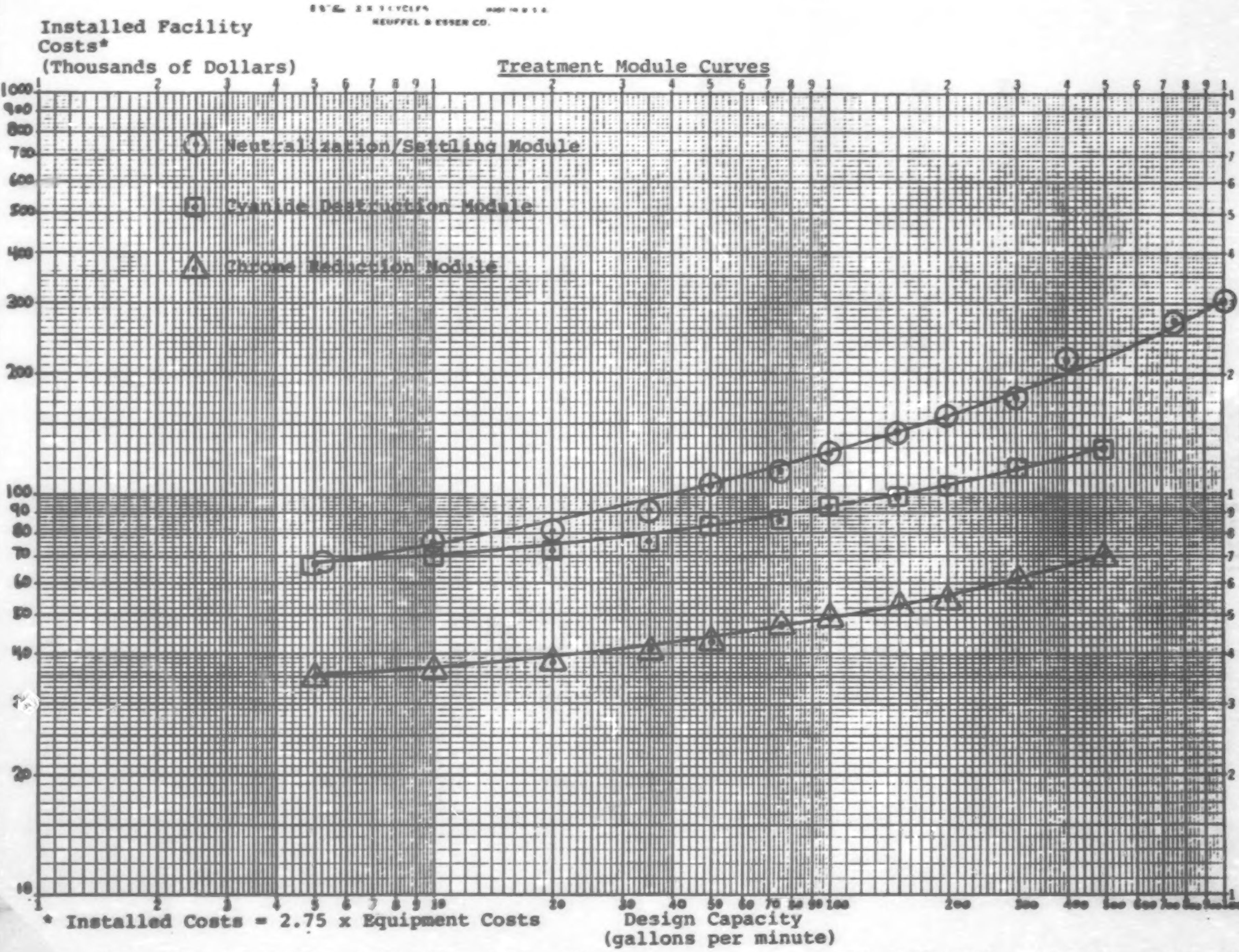
The Sludge Dewatering Tables suggest:

A. If the flow rate is less than 200 gpm and if sufficient land is available, use the costs for a sand drying bed for calculating the cost of compliance.

B. Flow (F) = 60 gpm
Concentration (C) = 40 mg/l
Number of Metals (N) = 4

The Installed Cost of a Sand Drying Bed =
$5.76 (F) (C-N) + 1375
$5.76 (60) (40-4) + 1375
$13,820

A copy of these curves and of the Sludge Dewatering tables follows.



Treatment Module Curves

* Installed Costs = 2.75 x Equipment Costs

Sludge Dewatering Mechanism

A. Selection of Type

gpm	Land Available	Land Not Available
<15	Sand Drying Bed	Sand Drying Bed*
15-200	Sand Drying Bed	Vacuum Filter
>200	Vacuum Filter	Vacuum Filter

B. Installed Costs of Sludge Dewatering Mechanism

1. Installed Costs For a Sand Drying Bed**

V = flow (gpm)
C = concentration of metals (mg/liter)
N = number of metals in process effluent

Installed Costs = 5.76(V)(C-N)+1375

2. Installed Costs of a Vacuum Filter***

Flow (gpm)	Cost
15-100	82,500
100-500	96,250
More than 500	110,000

* Plants with less than a 15 gpm flow, that do not have sufficient land available for a sludge drying bed, generally make the economic choice to haul the wet sludge rather than install a vacuum filter. The costs for the sand drying bed approximate the incremental future operation and maintenence expenses for hauling wet, rather than dry, sludge.

** See File Justification: "Sludge Dewatering Mechanism Cost Formulae." This document may be obtained from the Connecticut State Library, Hartford, Connecticut or from William Drayton, Jr., c/o McKinsey & Co., 245 Park Avenue, New York, N.Y. 10017

*** The installed costs include the costs of a centrifugal pump for the filtrate and an installation add-on equal to 175 percent of the purchased equipment costs.

If an operating and maintenance cost curve is developed, this too could be used with readily available information on a few variables. In the absence of such curves, O&M costs can be estimated using standard add-on factors commonly used and accepted by consulting engineers.

Use of Cost Information From Similar Facilities

The Department may sometimes be able to use cost data from a similar facility as the basis of cost of compliance calculations. Such a costing technique may be difficult to apply in practice since many unrelated factors affect these costs in water cases. Nonetheless, in some cases the Department will be able to identify similarities in cost-related characteristics of the "assessment case" and a "reference case" for which complete costing data is available. As Department cost experience increases, it is expected that a broad range of "reference cases" will provide a solid data base for comparative analysis.

Use of Cost Estimates Based On An Original Control Design

The Department may always make its own cost estimate based on an original control design prepared by Department engineers. While this technique is always available, it is far more costly to the Department than any other costing approach.

A survey of consulting engineers indicated that it would take approximately 1-2 days for an engineer familiar with costing and the general type of treatment technology to come up with a cost of compliance figure within the range of ±30% accuracy.* While this cost in engineer time is not prohibitive for a small number of cases a year, the Department does not anticipate using this costing approach unless no other technique is available.

PROCEDURES FOR FACILITATING COSTING BY THE DEPARTMENT

Water Compliance engineers report that in the early stages of any given case, it is difficult to predict the exact treatment system that will finally be approved. Accordingly, the first few months of both the order and permit process are characterized by considerable engineering research and by negotiations concerning the optimal treatment system between the Department and by the source. Yet it is this stage in the order process (when cost estimates are difficult to obtain) that most compliance delays occur. (See Part II above.)

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* See "Survey of Consulting Engineers," a CEP file memo available in the Connecticut State Library, Hartford, Connecticut, or from William Drayton, Jr., c/o McKinsey & Co., 245 Park Avenue, New York, N.Y. 10017.

The Department Economic Civil Assessment Regulations anticipate this difficulty and provide for a number of procedures to maximize enforcement impact during the period before reliable cost estimates become readily available. The Regulations:

* provide for warning letters which give notice of potential civil assessment liability to be sent upon detection of non-compliance that do not require an assessment amount to be specified

* permit the Department to delay sending notices of violation with specific assessment amounts until adequate cost data is available. (The Enforcement Act does not set a post-detection time interval within which a Notice of Violation must be sent. The interval is thus limited only by the standard of reasonableness. Assessments can accumulate during this interval as long as the Department's delay is not "unreasonable." Typically, courts will not find 6 to 9 months' delay unreasonable.)

* authorize the Department to delay any hearings on the issue of the assessment amount until reliable cost information is available.

* allow the Department to make partial collections of civil assessments imposed. (This partial collection device permits the Department to collect assessments at a reduced level until final costing data is obtainable.)

* include an important "correction-as-of-right" procedure whereby excessive assessments are cut to the precise amount payable when actual cost data are presented.* This correction procedure justifies the Department's use of rough but generally accurate estimating techniques since the regulatee is guaranteed that he will receive no economic injury due to faulty Department estimation.

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* Overpayments, if any, are refunded with appropriate interest.

CHAPTER III

HANDLING INFLATION

Inflation affects both the purchase price of replacement equipment and annual operating and maintenance costs. The significance of taking inflation into account in estimating the cash flow of the costs of compliance over a period of years hardly needs to be underlined after the experience of the last several years. Plant costs have increased almost 25 percent in 1972-74, and operating and maintenance costs, which reflect chiefly labor and energy costs, have been even more volatile.

INDEXING INFLATION

The economic assessment formula adjusts the estimated costs of compliance cash flow for inflation. All the Department need do is adjust the figure used as the assumed inflation (deflation) rate each year to reflect the average experience of the previous three years. A three-year rolling average is used to flatten out sudden sharp shifts in the rate both to reduce sudden shifts in assessment levels and because people making capital decisions similarly "smooth" adjustments in their "inflation expectations."

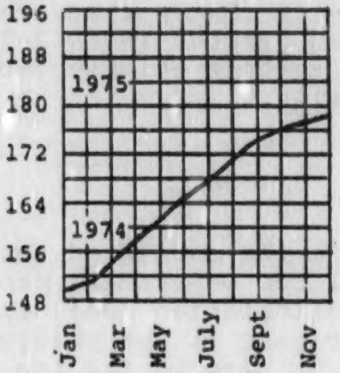
The civil assessment regulations allow the Commissioner to peg the inflation rate used in the assessment calculus to the Wholesale Price Index prepared by the U.S. Department of Labor or any other index that he finds is more appropriate. The U.S. Bureau of Labor Statistics, although it compiles cost indexes for hundreds of products and commodities, does not yet prepare a pollution control index.

The best available index appears to be the CE Plant Cost Index published by the trade journal, Chemical Engineering. It contains four major components: (1) equipment machinery, and supports, (2) construction labor, (3) building materials and labor, and (4) engineering supervision and manpower. This weighted index is generally accepted in the engineering profession as a highly accurate and reliable guide, and is currently used by the U.S. Environmental Protection Agency to update Agency publications.

If the Chemical Engineering Index is used, the rate of inflation (RI) the Department would use in its economic assessment calculus throughout 1975 would be 7.9 percent:

Calculating the Rate of Inflation

CE Plant Cost Index (1957-59 = 100)



Annual Index	Inflation Rate	3 Year Average
1969 = 119.0		
1970 = 125.7		
1971 = 132.2		
1972 = 137.2	3.8%	
1973 = 144.1	5.0%	7.9%
1974 = 165.4	14.8%	

The Department could also use another commonly accepted set of indices: the ENR Cost Indexes, based on costs in 20 cities around the U.S. and published weekly by the trade journal Engineering News Record. These consist of five indices for construction, building, common labor, skilled labor, and material costs. To modify these for use, the Department should average these five components, and calculate a weekly or monthly average.

CHAPTER IV

ADJUSTING FOR INDIVIDUAL INCOME TAX RATES

One of the key pieces of information required to operate the civil assessment formula is the regulatee's income tax bracket. It is a workably accurate assumption for over 80 percent of all companies that this rate is 48 percent. However, there are a few companies that will have lower tax rates. Moreover, most individuals and partnerships will be taxed at a lower rate, and municipalities and non-profit institutions are not subject to tax at all. For these cases the Department may wish to adjust the tax assumption used in the formula.

A source that does not pay income tax would be subject to civil assessments roughly twice those that persons who are taxed at the 48 percent rate would be, assuming that the Department decides to adjust the formula for differences in tax rate. This is so because investing in and operating abatement facilities generates a series of tax deductions and credits. These tax benefits become more significant the higher the source's income tax is. The entire capital cost of the facility becomes a series of deductions through the tax laws' depreciation provisions, and these provisions allow especially accelerated depreciation on pollution control investments. The cost of operating and maintaining the facility are deductible in exactly the same manner as other business expenses. Further, pollution abatement investments are eligible for an investment tax credit. A source that pays no tax receives no tax benefits from pollution control expenditures. Its net cost of compliance equals its gross cost of compliance.

ADJUSTING TAX RATES

Whether and how the Department wants to go about adjusting for differences in individual regulatees' tax rates depends on whether it is dealing with corporations, individuals/partnerships, or municipalities.

Corporations

Generally the Department will not have to worry about adjusting income tax rates where corporations are concerned. There are three types of corporations that may have low income tax rates: (1) companies operating at a loss, (2) companies that benefit from extraordinary tax deductions or credits, notably depletion allowances, even though they are operating profitably and (3) very small companies.

Companies operating at a loss generally do not expect to continue profitless for long. When they do become profitable, they will be able to use the tax advantages that accumulated during the period during which they were operating at a loss. Consequently, such companies will not alter their evaluation of what an abatement project will cost them after tax significantly. Moreover, their calculations and the CEP formula take into account the after-tax costs of any commitment well into the future, and the normal businessman is most unlikely to assume that he will be operating unprofitably continuously for twenty years. In other words, the Department need not worry about adjusting the formula for companies operating temporarily at a loss.

Companies with low tax rates because of extensive deductions and credits other than for operating losses are, however, a more serious problem. Special provisions in the tax laws, most notably depletion allowances that benefit companies involved in extractive activities, can largely or entirely eliminate a company's income tax liability. U. S. Steel and Occidental Petroleum, for example, pay negligible income taxes because of the tax cover such provisions allow. For such companies the after tax cost of an abatement investment is much higher than for most other businesses. However, the situation is likely to be relatively rare, especially given recent Congressional action to reduce and eliminate the oil depletion allowance. Therefore, unless the Department is dealing with an extractive industry, the Department staff should probably not worry about such cases.

Very small companies will be taxed at significantly lower rates, because the tax on corporations is graduated. This year the rate is 20 percent for the first $25,000 of taxable income, 22 percent for the second $25,000 of taxable income, and 48 percent for taxable income in excess of $50,000. This schedule of rates is effective for 1975 only. If it is not extended or otherwise changed, the former schedule will apply. Those rates are 22 percent for the first $25,000, 26 percent for the second $25,000, and 48 percent thereafter. Where a corporation's taxable income is sufficiently low that its overall tax rate deviates substantially from 48 percent, the Department may well want to modify the formula's income tax rate assumptions to fit the specific facts of the case.

Individuals and Partnerships

When the Department is dealing with individuals or partnerships, it should initially assume a tax rate of 19 percent for individuals (the approximate Connecticut average for household heads in 1972) and 18 percent for partnerships (the approximate Connecticut average for manufacturing partners in 1969). In addition, given the wide range of effective tax rates paid by such persons, the Department will want to adjust its tax assessment formula from case to case. How it can do so at low cost is outlined in the section immediately after the brief discussion of municipalities and nonprofit institutions.

Municipalities and Non-Profit Institutions

Municipalities and non-profit institutions do not pay income tax and therefore derive no tax benefits from whatever capital or operating and maintenance expenses they incur in order to abate pollution. When dealing with such institutions, the Department should adjust its civil assessment formula to assume a zero tax rate.

OBTAINING INDIVIDUAL TAX RATES

When the Department decides it must obtain individual tax rates in order to set accurate civil assessments, it can do so in two relatively simple ways:

- It can ask the regulatee to submit (1) its most recent balance sheets and income statements if it is a business and (2) its most recent income tax statement if the regulatee is an individual. The income tax statement is private information, and can be obtained from the IRS only by a state tax agency. However, the civil assessment regulations specifically provide that the Department can require such information, including financial data, as it needs, from the regulatee. Moreover, since individuals who are likely to be subject to civil assessments are also likely to be taxed at above average rates, the information will probably be provided voluntarily.
- For companies, especially publicly-held companies, this information is a matter of public record and may be found routinely in financial and investment publications such as Moody's Industrial Manual or the Value Line Investment Survey. (The first of these works is available in the Connecticut State Library.)

ADJUSTING THE FORMULA FOR CHANGES IN THE TAX LAWS

In applying civil assessments in individual cases, Department staff will not have to research or work through the impact of specific tax provisions. All this is handled automatically by the formula.

However, from time to time the provisions of the tax laws are changed. The investment tax credit is especially likely to be changed with cyclical change in the economy. The provisions in the formula should be changed accordingly. Chapter I identifies exactly where such adjustments should be made in the formula for each of the taxes that may have to be adjusted.

CHAPTER V

USING THE COST OF CAPITAL

One of the innovations of the Connecticut Enforcement Program is the attempt to put the regulatory agency into the shoes of the regulatee. Just as businessmen faced with environmental regulation focus immediately on the cost of raising and using money to meet environmental standards now and in the future, so must economic civil assessments take the current and continuing costs of using money into account.

Once the cost of compliance cash flow (which describes the cash outlays that will be required in each year of control programs) has been established, the economic assessment calculus discounts it at the cost of capital rate appropriate to the particular regulatee to a present value. If the cost of capital is 10 percent, expenditures of $1100 a year from now would be discounted to a present value of roughly $1000 (i.e., 1100/1+.10).

Such a discounting is necessary because ten dollars of expense three years from now is less painful than ten dollars due now. It is less painful because, over the three years one retains that ten dollars one can use it. If, for example, one could earn one dollar in each of the three years one had to invest the ten dollars, the net reduction in one's current worth attributable to this future expense is $7.51 $[.10/(1+.10)^3]$.

Businessmen evaluating the costs of different investment projects, including abatement projects, have to take the time value of money into account. They are keenly aware that ten dollars spent three years in the future entails considerably less cost than ten dollars spent now. Similarly, ten dollars received (or saved in taxes) three years hence is less valuable than such a savings received immediately. They consider the total present value of a project as its immediate costs plus future costs, reduced by a discount factor equal to the time value of money.

USING THE COST OF CAPITAL

A regulatee's cost of capital is its marginal cost per year of obtaining additional capital funds. For most businesses, the cost of capital is the weighted average of the costs of debt (e.g., bond issues or bank debt) and equity (e.g., sales of common stock). If a company's capital is 50 percent debt with a marginal cost of 10 percent and 50 percent equity with a current cost of 20 percent, the company's cost of capital will be 15 percent.

The CEP formula uses a marginal cost of capital rate so that the low interest costs on bonds sold twenty or thirty years ago do not depress the rate so as to make it a misleading measure of the current cost of money to the regulatee. The marginal cost of capital rate also effectively reflects changes in the market price of money of all sorts. When interest rates go up (and common stock prices down), the marginal cost of capital will go up, accurately reflecting the increased cost a regulatee will have to pay for the resources required for the control project.

The cost of capital is the right discount factor to use in the economic assessment calculus because (1) it is the cost business must pay for its money and (2) it therefore represents a minimum rate of return businessmen must obtain on their investments. A business will be able to earn at least this rate of return on any resources available to it, which makes it the proper discount rate for bringing future costs to present value.

The cost of capital is also a good measure of the opportunity costs of investing in pollution control. Not only are the outlays required for such expenditures not recouped, but they clearly generate no income above expenses. In the meantime, the regulatee must pay its cost of capital rate to obtain the money needed to pay for the expenditures. The civil assessment formula discounts future costs by the cost of capital and includes opportunity costs by using the cost of capital as the interest rate in the amortization formula. The flat, monthly rate which is thereby derived represents not only the dollar cost of control but also an interest component which equals the minimum rate of return available on the investment. The resulting civil assessment thus offsets not only equipment and operating costs savings due to noncompliance, but also the return on capital which would be made by investment of these savings in a profitable venture.

COMPONENTS OF THE COST OF CAPITAL

Since the cost of capital is the cost of raising or borrowing money, it is natural that different people and businesses have different costs of capital.

Industry-Wise Costs of Capital

Although the cost of capital is a key tool used all the time by businessesmen and economists, it is hard to pin down exactly, especially on a company-by-company basis, chiefly because of the difficulty of measuring the cost of the equity component. If equity is based on book value, distortions are possible for a variety of accounting reasons, e.g., because assets purchased long ago that have appreciated substantially may still be carried at their original worth. Using market value avoids this difficulty; in fact, the market adjusts equity values taking future as well as current value into account. However, market values (1) are not available for many potential regulatees, and (2) are subject to sharp swings not entirely caused by facts relevant to the particular case. The cost of capital of individual companies is an issue in litigation periodically and the result is virtually always a drawn-out, expensive and not clearly resolved contest. Connecticut's CEP regulations avoid these difficulties entirely by using industry average cost of capital figures. This practice has several other, equally important advantages.

- The Department's staff will not have to gather financial data about each company and go through a series of financial calculations (with which most engineers are unfamiliar). Instead, the staff will only have to decide to which industry group the regulatee belongs and look up that industry's cost of capital on a one-page table maintained by the Department.

- The Department will not have to worry about adjusting for temporary swings in a company's financial condition.

Moreover, the use of industry average data seems an acceptably accurate surrogate measure of company cost of capital rates. The CEP calculated the cost of capital for a large number of Connecticut companies and found relatively small deviations from the industry average figures. Furthermore the courts have traditionally approved the use of industry average cost of capital figures in the regulation of individual companies.

The Department has now compiled a table of the industry-wide costs of capital averages for each of the industrial groupings in Connecticut. These averages were derived using the weighted cost of capital methodology outline above, using data drawn from such readily available and reliable sources as *Standard and Poors*, *Financial Dynamics*, the Federal Trade Commission's *Quarterly Reports of Financial Data for Manufacturing Companies*, and the Internal Revenue Service's *Corporation Income Tax Returns*. This table may be found in Section B in Chapter VII of Part V below.

Municipal Costs of Capital

Like businesses, municipalities have a cost of capital. Since bond revenue is usually the only source of raising capital for most cities, towns, and villages, the municipal cost of capital is usually equal to the bond rate which must be paid on newly issued municipal bonds. (While some economists believe that the governmental cost of capital should reflect the costs of taking money out of the private sector, and should thus be equal at least to the average private sector cost of debt, this theory has not yet achieved general acceptance -- at least not in the governmental community.) Accordingly, the municipal cost of capital will be the most recent average municipal bond rate in Connecticut.

Individual Costs of Capital

Individuals too have costs of capital, most frequently the interest rate they must pay on money they borrow. Accordingly, in those rare instances where civil assessments are to be imposed against individuals, the individual cost of capital will be the current average interest rate on generally available personal loans.

PART IV

PROPOSED CIVIL ASSESSMENT REGULATIONS

STATE OF CONNECTICUT
RULES AND REGULATIONS
OF
THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

CONCERNING: ASSESSMENT OF CIVIL PENALTIES FOR ILLEGALLY DISCHARGING WITHOUT A PERMIT

Section 22a-6b-502(a). Title.

This section shall be known and may be cited as "Civil Penalty Regulations: Discharging Without a Permit."

Section 22a-6b-502(b). Definitions.

(1) "Assessment period" means the period of time expressed in months or portions thereof, during which a non-permitted discharge has been allowed or maintained by a regulatee.

(2) "Cost of capital" means, as determined by the Commissioner, either: (i) the weighted average of the marginal rates the Commissioner finds a regulatee or class of regulatees typically must pay per year for debt and owner's equity or (ii) the annual rate of return or of savings that the Commissioner finds a regulatee or class of regulatees could achieve with a sum of money equal to the cost of compliance.

(3) "Cost of compliance" means the net, after tax estimated present value of the sum of facility costs, operating costs and all other costs and savings the non-permitted discharger will experience in order to qualify for a permit including such replacement costs as will later be necessary to replace capital equipment that has either worn out or become obsolete, and taking into account inflation, depreciation and a discount rate equal to the cost of capital.

(4) "Depreciable life" means the time period of useful life expectancy for facilities used to protect the waters of the state from pollution. This period shall be defined as 15 years until and unless the Commissioner finds otherwise pursuant to Section 22a-6b-502(e) or (h), in which case he may consider the depreciation periods allowed for tax purposes by the U.S. Internal Revenue Service and such other guides as he determines are similarly reliable.

(5) "Depreciation" means the writing off, in steps, of facility costs over the depreciable life of the facility.

(6) "Discharge" means the emission of any water, substance or material into the waters of the state whether or not such substance causes pollution.

(7) "Facility costs" means the capital and installation costs of such facilities as are or may be required to protect the waters of the state from pollution.

Such costs shall include, but not be limited to, the cost of equipment, structures, activities, or other facilities required to protect the waters of the state from pollution and, in addition, costs of necessary auxiliary equipment, technical and engineering services and all development and start-up costs including labor, materials, and necessary testing, but shall not include operating costs.

(8) "Inflation" means the average annual rate of inflation as measured by the changes in the Wholesale Price Index prepared by the United States Department of Labor or such other index of inflation as the Commissioner may determine is most appropriate over the 3 years prior to the year in which the civil penalty is to be assessed.

(9) "Municipality" means any metropolitan district, town, consolidated town and city, consolidated town and borough, city, borough, village, fire and sewer district, sewer district and each municipal organization having authority to levy and collect taxes or make charges for its authorized function.

(10) "Non-permitted discharge" means any discharge to the waters of the state for which Sections 25-54c to 25-54l (inclusive) of the Connecticut General Statutes, as amended, or any Regulation promulgated by the Department of Environmental Protection requires possession of a permit, made when no such permit for such discharge is or was in effect.

(11) "Non-permitted discharger" means any regulatee that has initiated, created or originated or is maintaining or allowing a non-permitted discharge.

(12) "Operating costs" means the non-depreciable annual costs for the operation and maintenance of facilities and processes required to protect the waters of the state from pollution which will safeguard installed control facilities and/or ensure continous protection of the waters of the state from pollution.

(13) "Party" means each regulatee named or admitted as a party, or properly seeking and entitled as of right to be admitted as a party to any administrative proceeding involved in the assessment of a civil penalty.

(14) "Permit" means any license to discharge to the waters of the state issued pursuant to Section 25-54i of the General Statutes as amended, and any order issued pursuant to Sections 25-54 g, h, j or k of the General Statutes that serves as a National Pollutant Discharge Elimination System permit.

(15) "Person" means any individual, partnership, association, firm, corporation, or other entity, except a municipality.

(16) "Regulatee" means any person or municipality.

Section 22a-5b-502(c). Civil Penalties for Discharging Without a Permit.

Any non-permitted discharger shall be liable for a civil penalty pursuant to Section 22a-6b (a)(2) of the Connecticut General Statutes, as amended, and may be assessed such a penalty by the Commissioner.

Section 22a-6b-502(d). Schedule of Maximum Assessments.

(1) Any non-permitted discharger may be assessed an amount for each month of the assessment period no greater than the amount listed in the following schedule for the combination of facility costs and operating costs which will be required for an approved system to treat the discharge so as to qualify for any permits required for such discharge.

(2) The maximum amounts set forth in this schedule represent the economic advantages that a regulatee who maintains a non-permitted discharge would gain from one month's delay in obtaining a permit for such discharge. The schedule assumes economic conditions all tending to increase the value to the non-permitted discharger of such delay. These maximum amounts have been calculated in three broad steps: a cash flow for each set of compliance expenditures, chiefly facility costs and operating costs, is defined; this cash flow is discounted to present value; and the maximum monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the present value of the project. A written explanation of these calculations shall be available upon request.

(3) The Commissioner shall impose lesser penalties pursuant to Section 22a-6b-502(e)(1) if he finds the probable economic advantages of delay are smaller than indicated in this schedule and he may further lower these penalties pursuant to Sections 22a-6b-502(e)(4), 22a-6b-503(g) and/or 22a-6b-502(h).

(4) In no case shall the assessment exceed $25,000, plus $1,000 for each day that the assessment period continued after the non-permitted discharger assessed the civil penalty received a civil penalties final order.

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SCHEDULE OF MAXIMUM ALLOWABLE MONTHLY CIVIL

PENALTIES FOR NON-PERMITTED DISCHARGERS

WITH SPECIFIED COSTS

OPERATING COSTS	FACILITY COSTS													
	$0-2500	$2501-5000	$5001-10,000	$10,001-20,000	$20,001-35,000	$35,001-50,000	$50,000-70,000	$70,001-100,000	$100,001-150,000	$150,001-200,000	$200,001-300,000	$300,001-500,000	$500,001-1,000,000	$1,000,000 and above
$0-1000	334	451	686	1156	1861	2566	3506	4916	7266	9616	14316	23715	47214*	•
$1001-2500	658	776	1010	1480	2185	2890	3830	5240	7590	9940	14640	24040	47539*	•
$2501-5000	1199	1316	1551	2021	2726	3431	4371	5781	8131	10481	15181	24580	48079*	•
$5001-7500	1739	1857	2092	2562	3267	3971	4911	6321	8671	11021	15721	25121	48620*	•
$7501-10,000	2280	2397	2632	3102	3807	4512	5452	6862	9212	11562	[illegible]	25661	49160*	•
$10,001-15,000	3361	3478	3713	4183	4888	5593	6533	7943	10293	12643	17343	26743	50241*	•
$15,001-20,000	4442	4559	4794	5264	5969	6674	7614	9024	11374	13724	18424	27823	51322*	•
$20,001-25,000	5523	5640	5875	6345	7050	7755	8695	10105	12455	14805	19505	28904*	52404*	•
$25,001-35,000	7685	7802	8037	8507	9212	9917	10857	12267	14617	16967	21667	31066*	54566*	•
$35,001-50,000	10928	11045	11280	11750	12455	13160	14100	15510	17860	20210	24910	34310*	•	•
$50,001-75,000	16333	16451	16686	17156	17861	18566	19506	20915	23265	25615	30315*	39715*	•	•
$75,001-100,00	21738	21856	22091	22561	23266	23971	24911	26321	28671*	31021*	35720*	45120*	•	•
$100,001-200,00	43359*	43477*	43712*	44182*	44887*	45592*	46532*	47942*	50291*	52642*	•	•	•	•
$200,000 and above	•	•	•	•	•	•	•	•	•	•	•	•	•	

* No more than $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

* Once the $25,000 element of the maximum is used up, the maximum monthly charge will be $1000 times the number of days in the month.

(5) The Commissioner has determined that the maximum civil penalties provided in this schedule will insure immediate and continued compliance and will protect (i) the public health, safety, and welfare; (ii) the public trust in the water, land and other natural resources of the state; and (iii) the reasonable use of property.

Section 22a-6b-502(e). Determination of Amount in Individual Cases.

(1) The Commissioner shall determine the amount of the monthly civil penalty he assesses for each individual case of discharging without a permit based on the savings that has been or will be realized by the non-permitted discharger as a result of delaying payment of the actual or estimated cost of compliance necessary to obtain a permit. Assessments in individual cases are calculated in four broad steps: the gross cash flow of the required compliance expenditures, chiefly facility costs and operating costs, is determined or estimated; the net cash flow is established by taking tax and other savings into account; the net cash flow is discounted to present value; and the individual monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the net present value of the project.

(2) If, before the non-permitted discharger has obtained a permit, the Commissioner determines that he does not have enough information regarding that discharger's cost of compliance to determine the assessment amount accurately, he may base his assessment on an estimated cost of compliance for a treatment approach that he determines will generally be sufficient to protect the waters of the state against pollution in such cases.

(3) The Commissioner shall make a written explanation of the general methodology used in determining the amount of the penalty in individual cases available on request.

(4) In setting a civil penalty in a particular case, the Commissioner shall consider all factors which he deems relevant, including but not limited to those listed in Section 22a-6b (c) of the General Statutes, as amended, and he may, as a result of considering and balancing these factors, lower the civil penalty calculated pursuant to Section 22a-6b-502(e)(1). The Commissioner shall maintain a record of each instance in which he lowers a civil penalty pursuant to this section. This record shall include the name and address of the regulatee whose penalty was lowered, the amount of the penalty before and after lowering and a summary of the grounds for lowering.

(5) In no case shall an individual assessment exceed either (i) the maximum monthly civil penalty set out in the schedule in Section 22a-6b-502(d) for a case requiring the same facility costs and operating costs, or (ii) for the total civil penalty due during the entire assessment period, $25,000 plus $1,000 for each day that the failure to obtain a permit continued after the regulatee received a civil penalties final order.

Section 22a-6b-502(f). Enforcement Proceedings.

(1) Warning Letter. If the Commissioner finds that a regulatee is probably a non-permitted discharger, he shall send such regulatee a civil penalties warning letter by certified mail or by personal delivery or service. This letter shall notify the regulatee that the Commissioner has reason to believe the regulatee is maintaining a non-permitted discharge and, as a result, could be assessed a civil penalty under Section 22a-6b-502 of the Civil Penalties Regulations. For those cases to which Section 22a-6b-502(g)(2)(i) applies, this warning letter shall also notify the regulatee that it may be able to avoid the imposition of civil penalties under Section 22a-6b-502 for up to one-half of the assessment period if it takes prompt and effective action pursuant to the terms of Section 22a-6b-502(g)(2)(i) and (ii).

(2) General. Enforcement proceedings under this section shall be conducted pursuant to the requirements of Section 22a-6b-101 of the Civil Penalty Regulations.

Section 22a-6b-502(g). Mitigation.

(1) General. The Commissioner may mitigate any civil penalty levied under this section upon such terms as he in his discretion deems proper or necessary upon consideration of the factors set forth in Section 22a-6b(b) of the General Statutes. The Commissioner shall maintain a record of each instance in which he mitigates a civil penalty. This record shall include the name and address of the regulatee whose penalty was mitigated, the amount of the penalty before and after mitigation and a summary of the grounds for mitigation.

(2) Partial Nonimposition During Prompt Compliance.

(i) If, upon receipt of a warning letter defined in Section 22a-6b-502(f)(1) and continously thereafter until the end of the assessment period, the non-permitted discharger takes prompt and effective action to protect the waters of the state from pollution by its discharge, the Commissioner shall not impose the civil penalty assessable under Section 22a-6b-502 for the period between receipt of the notice of violation and the end of the assessment period, or for any period more than one year prior to receipt of the notice of violation.

(ii) If the warning letter requests preparation of a compliance plan, the non-permitted discharger shall be deemed to have taken prompt and effective action during the period between receipt of such a request and submission of the requested plan if (a) the plan is a detailed written plan of action including a timetable which, once implemented, will qualify the discharger for a permit as promptly and effectively as possible and if (b) it is submitted within forty days after receipt of such a request or within such longer period as the request may specify. The non-permitted discharger shall also be deemed to have taken prompt and effective action, though it takes no further steps, during the subsequent period between its submission of such a satisfactory plan of action and five days after it has been notified that the Department has completed its review of the plan and or has issued an order. Thereafter -- and, if the warning letter does not request the preparation of a compliance plan, from the time the non-permitted discharger receives the warning letter -- the non-permitted discharger must take all steps necessary to qualify for a permit as promptly and effectively as possible if it is to meet the standard of performance required in Section 22a-6b-502(g)(2)(i).

(iii) Section 22a-6b-502(g)(2)(i) shall not apply to non-permitted dischargers who, within the preceding 8 years, have been referred to the Attorney General for discharging without a permit, have been issued a warning letter under Section 22a-6b-502(f)(1) of this regulation, have been issued actual written notice that they are maintaining or have previously maintained a non-permitted discharge, or have applied for a Connecticut permit for the discharge in question or any other similiar discharge.

Section 22a-6b-502(h). Correction of Penalties.

(1) A regulatee in receipt of a notice of violation issued pursuant to this regulation and Section 22a-6b-101(a) of the Civil Penalty Regulations may petition the Commissioner for correction of the civil penalty assessed against him at any time between the date of the notice and six months after the Commissioner issued the required permit or permits to such regulatee. Such petition shall set forth in writing evidence that the cost of compliance or the assessment period has been or will be less than the Commissioner had initially determined in assessing the civil penalty. Such petition shall be sent by certified mail or personal service to the Commissioner or his designees.

(2) The Commissioner may, in response to such a petition lower an assessment if he determines that the evidence in the petition establishes that the estimates of the cost of compliance on which the penalty amount was based and/or the assessment period used in assessing the penalty was excessive. The Commissioner shall maintain a record of each instance in which he corrects a civil penalty. This record shall include the name and address of the regulatee whose penalty was corrected, the amount of the penalty before and after correction and a summary of the grounds for correction.

(3) If the Commissioner takes no action in response to such a petition or if his response is not satisfactory to the petitioning regulatee, such regulatee may obtain a hearing as of right once it has received the required permit or permits. A hearing of right may also be obtained at any other time as the Department and the regulatee agree to, if such agreement is incorporated into a final determination on the permit application of the non-permitted discharger or a civil penalties final order. Following such a hearing the Commissioner shall lower the civil penalty if and to the extent that (A) the costs of compliance actually incurred have been less than he had initially determined and/or (B) the total number of days during which the non-permitted discharge was maintained was less than the total number of days for which assessments have been made.

(4) If the Commissioner does not lower an assessment in response to a petition for correction that includes an estimate of the cost of compliance based on detailed plans and specifications approved by the Commissioner and the cost of compliance in the petition is equal to seventy-five percent (75%) or less of the cost of compliance used by the Commissioner in calculating the civil assessment levied against the petitioner, the Commissioner shall thenceforth and until the petitioner receives the required permit or permits collect only that portion of the assessment levied that would have been levied if the cost of compliance in the petition had been used in calculating it. The Commissioner shall not be required to refund at this time any portion of what he had collected earlier as a result of this adjustment. The Commissioner may also collect less than the total assessment due in response to other petitions if he determines that there is evidence that estimates of the cost of compliance used in calculating the assessment may have been excessive. Partial collection does not relieve the non-permitted discharger who is assessed a civil penalty of its obligation to pay the uncollected portion of the assessment.

(5) Refunds shall be made, with interest calculated from the time of payment and at the cost of capital rate used to assess the civil penalty.

Section 22a-6b-502(i). Reduction of the Assessment Period for Uncontrollable Delays.

(1) The Commissioner shall exclude from the assessment period such periods of non-compliance as the non-permitted discharger that has been assessed a civil penalty proves have been caused by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectible accidents, where such acts or events were occasioned directly upon the regulatee assessed or another under contract to that regulatee. In addition, the Commissioner shall exclude from the assessment period such periods of non-compliance as were occasioned by delays attributable to the Water Compliance Unit of the Department in excess of reasonable processing times.

(2) Nothing in this section shall prohibit a regulatee from proposing, or the Department from accepting, a time schedule which excludes from the assessment period periods of non-compliance caused by other acts or events not covered by subsection (1) of this section such as contractor's or supplier's delays.

Section 22a-6b-502(j). Limited Inclusion of Pre-Detection Period of Discharging Without a Permit.

No period prior to issuance of a notice of violation shall be included in an assessment period under this section if: (1) it took place prior to the effective date of this section or (2) took place more than two years prior to detection.

Section 22a-6b-502(k). Request for Information by the Commissioner.

The Commissioner may require the regulatee assessed to provide such additional information, including information regarding costs, as he deems necessary to effectuate the purposes of Section 22a-6b-502.

Section 22a-6b-502(l). Collection.

(1) Payment of the civil penalties assessed under this section may be required monthly, or at such time or time intervals, or in such amounts as the Commissioner determines will most effectively limit the Department's administrative costs and further the objectives defined in Section 22a-6b-502(d).

(2) The present value of the total civil penalty assessed, calculated at the time the notice of violation is issued, shall be held constant regardless of the timing of its collection.

STATE OF CONNECTICUT
RULES AND REGULATIONS
OF
THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

CONCERNING: ASSESSMENT OF CIVIL PENALTIES FOR VIOLATION OF THE TERMS OF ORDERS TO ABATE POLLUTION OF OR CORRECT POTENTIAL SOURCES OF POLLUTION TO THE WATERS OF THE STATE

Section 22a-6b-503(a). Title.

This section shall be known and may be cited as "Civil Penalty Regulations: Violations of the Terms of an Order to Abate Pollution of or to Correct Potential Sources of Pollution to the Waters of the State."

Section-22a-6b-503(b). Definitions.

(1) "Civil penalties final order" means an order of the Commissioner of the Department of Environmental Protection levying a civil penalty issued pursuant to Section 22a-6b-101 or Sections 22a-6b-500 through 599 of the Civil Penalty Regulations which has become final by the passage of time, the consent of the regulatee to whom the order applies, or after hearing.

(2) "Cost of capital" means, as determined by the Commissioner, either: (i) the weighted average of the marginal rates the Commissioner finds a regulatee or class of regulatees typically must pay per year for debt and owner's equity or (ii) the annual rate of return or of savings that the Commissioner finds a regulatee or class of regulatees typically could achieve with a sum of money equal to the cost of compliance.

(3) "Cost of compliance" means the net, after tax estimated present value of the sum of facility costs, operating costs and all other costs and savings the regulatee will experience in order to come into compliance including such replacement costs as will later be necessary to replace capital equipment that has either worn out or become obsolete, and taking into account inflation, depreciation and a discount rate equal to the cost of capital.

(4) "Depreciable life" means the time period of useful life expectancy for facilities used to abate water pollution or correct potential sources of water pollution. This period shall be defined as 15 years until and unless the Commissioner finds otherwise pursuant to Section 22a-6b-503(e) or (h), in which case he may consider the depreciation periods allowed for tax purposes by the U.S. Internal Revenue Service and such other guides as he determines are similarly reliable.

(5) "Depreciation" means the writing off, in steps, of facility costs over the depreciable life of the facility.

(6) "Facility costs" means the capital and installation costs of such facilities as are or may be required to abate pollution of or correct potential sources of pollution to the waters of the state. Such costs shall include, but not be limited to, the cost of equipment, structures, activities, or other facilities required to abate pollution of or correct potential sources of pollution to the waters of the state, and, in addition, costs of necessary auxiliary equipment, technical and engineering services and all development and start-up costs including labor, materials, and necessary testing, but shall not include operating costs.

(7) "Final order" means an order of the Commissioner issued or in force pursuant to Sections 25-27, 25-54g, 25-54h, 25-54j, 25-54k, 25-54l, or 25-54aa of the General Statutes, as amended, the recipient of which (A) has failed to exercise in timely fashion its right to a hearing before the Commissioner, under Section 25-54o of the General Statues, as amended, or (B) has exercised such right to a hearing, following which the Commissioner has issued a final determination pursuant to Section 25-54o or 25-54p of the General Statutes, as amended. For the purposes of this regulation only, a permit issued by the Commissioner pursuant to Section 25-54i of the General Statutes, as amended, shall be considered to be a final order.

(8) "Inflation" means the average annual rate of inflation as measured by the changes in the Wholesale Price Index prepared by the United States Department of Labor or such other index of inflation as the Commissioner may determine is most appropriate over the 3 years prior to the year in which the civil penalty is to be assessed.

(9) "Municipality" means any metropolitan district, town, consolidated town and city, consolidated town and borough, city, borough, village, fire and sewer district, sewer district and each municipal organization having authority to levy and collect taxes or make charges for its authorized function.

(10) "Operating costs" means the non-depreciable annual costs for the operation and maintenance of facilities and processes required to abate pollution of or correct potential sources of pollution to the waters of the state which will protect installed control facilities and/or ensure continuous compliance with the terms of applicable final orders.

(11) "Order assessment period" means the period of time, measured in months or portions thereof, (A) that a regulatee is late in conforming to an order's time

schedule as measured by the time that has elapsed between the date a step is due and the date that the abatement, control or compliance measures called for in the step are completed, or (B) during which a regulatee has failed to comply with any other requirement of such order.

(12) "Party" means each person or municipality named or admitted as a party, or properly seeking and entitled as of right to be admitted as a party to any administrative proceeding involved in the assessment of a civil penalty.

(13) "Person" means any individual, partnership, association, firm, corporation, or other entity, except a municipality.

(14) "Regulatee" means any person or municipality that is under or has been issued a final order of the Commissioner.

(15) "Step" means one or more actions that a final order requires a regulatee to take and includes intermediate steps as well as the final step required by the final order, but does not include monitoring requirements.

(16) "Time schedule" means the date or series of dates by which a final order requires a regulatee to take a specified step or specified steps (including engineering design and planning work) to abate pollution of or correct potential sources of pollution to the waters of the state.

Section 22a-6b-503(c). Civil Penalties for Violating the Terms of a Final Order.

Any regulatee that has failed to complete a step required by a final order in accordance with any applicable time schedule or other requirements of such order shall be liable for a civil penalty assessed by the Commissioner pursuant to Section 22a-6b (a)(3) of the General Statutes in accordance with the procedures prescribed in Section 22a-6b-101 of the Civil Penalty Regulations. The Commissioner may levy an assessment against any such regulatee.

Section 22a-6b-503(d). Schedule of Maximum Assessments.

(1) Any regulatee who has not complied with a step of a final order in accordance with the time schedule or other requirements of such order may be assessed an amount for each month of delayed compliance no greater than the amount listed in the following schedule for the combination of facility costs and operating costs which will be or has been required to comply with all the steps of the final order.

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SCHEDULE OF MAXIMUM ALLOWABLE MONTHLY CIVIL
PENALTIES FOR VIOLATORS OF ORDER TERMS
WITH SPECIFIED COSTS

OPERATING COSTS	FACILITY COSTS													
	$0-2500	$2501-5000	$5001-10,000	$10,001-20,000	$20,001-35,000	$35,001-50,000	$50,000-70,000	$70,001-100,000	$100,001-150,000	$150,001-200,000	$200,001-300,000	$300,001-500,000	$500,001-1,000,000	$1,000,000 and above
$0-1000	336	451	686	1156	1861	2566	3506	4916	7266	9616	14316	23715	47214*	•
$1001-2500	658	776	1010	1480	2185	2890	3830	5240	7590	9940	14640	24040	47539*	•
$2501-5000	1199	1316	1551	2021	2726	3431	4371	5781	8131	10481	15181	24580	48079*	•
$5001-7500	1739	1857	2092	2562	3267	3971	4911	6321	8671	11021	15721	25121	48620*	•
$7501-10,000	2280	2397	2632	3102	3807	4512	5452	6862	9212	11562	16262	25661	49160*	•
$10,001-15,000	3361	3478	3713	4183	4888	5593	6533	7943	10293	12643	17343	26742	50241*	•
$15,001-20,000	4442	4559	4794	5264	5969	6674	7614	9024	11374	13724	18424	27823	51322*	•
$20,001-25,000	5523	5640	5875	6345	7050	7755	8695	10105	12455	14805	19505	28904*	52404*	•
$25,001-35,000	7685	7802	8037	8507	9212	9917	10857	12267	14617	16967	21667	31066*	54566*	•
$35,001-50,000	10928	11045	11280	11750	12455	13160	14100	15510	17860	20210	24910	34310*	•	•
$50,001-75,000	16333	16451	16686	17156	17861	18566	19506	20915	23265	25615	30315*	39715*	•	•
$75,001-100,00	21738	21856	22091	22561	23266	23971	24911	26321	28671*	31021*	35720*	45120*	•	•
$100,001-200,00	43359*	43477*	43712*	44182*	44887*	45592*	46532*	47942*	50291*	52641*	•	•	•	•
$200,000 and above	•	•	•	•	•	•	•	•	•	•	•	•	•	

* No more than $25,000 plus $1000 for each day that the unabated activity continues after the regulatee has received a civil penalties final order.

• Once the $25,000 element of the maximum is used up, the maximum monthly charge will be $1000 times the number of days in the month.

(2) The maximum amounts set forth in this schedule represent the economic advantages that a regulatee who does not comply with the terms of a final order would gain from one month's delay in meeting the final step of such order. The schedule assumes economic conditions all tending to increase the value to the regulatee of such delay. These maximum amounts have been calculated in three broad steps: a cash flow for each set of compliance expenditures, chiefly facility costs and operating costs, is defined; this cash flow is discounted to present value; and the maximum monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the present value of the project. A written explanation of these calculations shall be available upon request.

(3) The Commissioner shall impose lesser penalties pursuant to Section 22a-6b-503(e)(1) if he finds the probable economic advantages of delay are smaller than indicated in this schedule and he may further lower these penalties pursuant to Sections 22a-6b-503(e)(4), 22a-6b-503(g) and/or 22a-6b-503(h).

(4) In no case shall the assessment exceed $25,000, plus $1,000 for each day that the order assessment period continues after the regulatee assessed the civil penalty has received a civil penalties final order.

(5) The Commissioner has determined that the maximum civil penalties provided in this schedule will insure immediate and continued compliance and will protect (i) the public health, safety, and welfare; (ii) the public trust in the water, land and other natural resources of the state; and (iii) the reasonable use of property.

Section 22a-6b-503(e). Determination of Amount in Individual Cases.

(1) The Commissioner shall determine the amount of the monthly civil penalty he assesses for each individual case of failure to comply with the terms of a final order based on the savings that will be realized by the regulatee as a result of delaying payment of the actual or estimated cost of compliance with all steps of such order. Assessments in individual cases are calculated in four broad steps: the gross cash flow of the required compliance expenditures, chiefly facility costs and operating costs, is determined or estimated; the net cash flow is established by taking tax and other savings into account; the net cash flow is discounted to present value; and the individual monthly civil penalty is calculated as that amount which would, if paid monthly, amortize the net present value of the project.

(2) If, before the regulatee has come into compliance with the terms of his order, the Commissioner determines that he does not have enough information regarding that regulatee's cost of compliance to determine the assessment amount accurately, he may base his assessment on the cost of compliance for a treatment approach that he determines will generally be effective in ensuring that applicable standards are met.

(3) The Commissioner shall make a written explanation of the general methodology used in determining the amount of the penalty in individual cases available on request.

(4) In setting a civil penalty in a particular case, the Commissioner shall consider all factors which he deems relevant, including but not limited to those listed in

Section 22a-6b (c) of the General Statutes, as amended, and he may, as a result of considering and balancing these factors, lower the civil penalty calculated pursuant to Section 22a-6b-503(e)(1). The Commissioner shall maintain a record of each instance in which he lowers a civil penalty. This record shall include the name and address of the regulatee whose penalty was lowered, the amount of the penalty before and after lowering and a summary of the grounds for lowering.

(5) In no case shall an individual assessment exceed either (i) the maximum monthly civil penalty set out in the schedule in Section 22a-6b-503(d) for a final order requiring the same facility costs and operating costs, or (ii) for the total civil penalty due during the entire order assessment period, $25,000 plus $1,000 for each day that the failure to comply with the time schedule and/or other terms of the final order continued after the regulatee received a civil penalties final order.

Section 22a-6b-503(f). Enforcement Proceedings.

(1) Warning Letter. If the Commissioner finds that the terms of a final order have probably been violated, he may send the responsible regulatee a civil penalites warning letter by certified mail or by personal delivery or service. This letter shall notify the regulatee that the Commissioner has reason to believe a violation has occurred and that the violation could result in a civil assessment under Section 22a-6b of the General Statutes, as amended, and this section of the Civil Penalties Regulations.

(2) General. Enforcement proceedings under this section shall be conducted pursuant to the requirements of Section 22a-6b-101 of the Civil Penalty Regulations.

(3) Hearing

(i) Hearings held pursuant to Section 22a-6b-101(b) shall be conducted by the Commissioner, a Deputy Commissioner, or a duly appointed hearing officer. Such hearings shall be conducted pursuant to Sections 4-177 to 4-184, inclusive, of the General Statutes, as amended, and the Rules of Practice of the Department.

(ii) If the Commissioner, Deputy Commissioner, or hearing officer presiding at the hearing determines that information important to an accurate determination of all or part of the civil penalty amount is not available at the time of the hearing, but will become available later, he may defer determining the amount of the civil penalty due until he establishes that the previously missing information is available; at which time he shall promptly reconvene the hearing regarding the amount of the civil penalty. The Commissioner may not collect any portion of the civil penalty until such hearing has been reconvened and completed and a civil penalties final order has been issued.

Section 22a-6b-503(g). Mitigation.

The Commissioner may mitigate any civil penalty upon such terms as he in his discretion deems proper or necessary upon consideration of the factors set forth in Section 22a-6b (b) of the General Statutes. The Commissioner shall maintain a record of each instance in which he mitigates a civil penalty. This record shall include the name and address of the regulatee whose penalty was mitigated, the amount of the penalty before and after mitigation and a summary of the grounds for mitigation.

Section-22a-6b-503(h). Correction of Penalties.

(1) A regulatee in receipt of a notice of violation issued pursuant to this section of the Civil Penalty Regulations may petition the Commissioner for correction of the civil penalty assessed against him at any time between the date of notice and six months after the Commissioner finds that the regulatee has come into compliance. Such petition shall set forth in writing evidence that the cost of compliance or the order assessment period has been or will be less than the Commissioner had initially determined in assessing the civil penalty, and it shall be sent by certified mail or personal service to the Commissioner or his designee.

(2) The Commissioner may, in response to such a petition lower an assessment if he determines that the evidence in the petition establishes that the estimates of the cost of compliance on which the penalty amount was based and/or the order assessment period used in assessing the penalty were excessive. The Commissioner shall maintain a record of each instance in which he corrects a civil penalty. This record shall include the name and address of the regulatee whose penalty was corrected, the amount of the penalty before and after correction and a summary of the grounds for correction.

(3) If the Commissioner takes no action in response to such a petition within 60 days of the receipt thereof, or if his response is not satisfactory to the petitioning regulatee, such regulatee may obtain a hearing as of right once it has come into compliance. A hearing of right may also be obtained at any other time as the Department and the regulatee agree to, if such agreement is incorporated into a final order or a civil penalties final order. Following such a hearing the Commissioner shall lower the civil penalty if and to the extent that (A) the costs of compliance actually incurred have been less than he had initially determined and/or (B) the total number of days during which the order terms were not complied with was less than the total number of days for which assessments have been made. Refunds shall be made with interest calculated from the time of payment and at the cost of capital rate used to assess the civil penalty.

(4) If the Commissioner does not lower an assessment in response to a petition for correction that includes an estimate of the cost of compliance based on detailed plans and specifications approved by the Commissioner and the cost of compliance in the petition is equal to seventy-five percent (75%) or less of the cost of compliance used by the Commissioner in calculating the civil assessment levied against the petitioner, the Commissioner shall thenceforth collect only that portion of the assessment levied that would have been levied if the cost of compliance in the petition had been used in calculating it. The Commissioner may also collect less than the total assessment due in response to other petitions if he determines that there is evidence that estimates of the cost of compliance used in calculating the assessment may have been excessive. Partial collection does not relieve the regulatee assessed of its obligation to pay the uncollected portion of the assessment.

Section-22a-6b-503(i). Reduction of the Order Assessment Period for Uncontrollable Delays.

(1) The Commissioner shall exclude from the order assessment period such periods of non-compliance as the regulatee assessed proves have been caused by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectible accidents, where such acts or events were occasioned directly upon the regulatee assessed or another under contract to that regulatee. In addition, the Commissioner

shall exclude from the order assessment period such periods of non-compliance as were occasioned by delays attributable to the Water Compliance Unit of the Department in excess of reasonable processing times.

(2) Nothing in this section shall prohibit a regulatee from proposing, or the Department from accepting, a time schedule which excludes from the order assessment period periods of non-compliance caused by other acts or events not covered by subsection (1) of this section such as contractor's or supplier's delays.

Section-22a-6b-503(j). Request for Information by the Commissioner.

The Commissioner may require the regulatee assessed to provide such additional information, including information regarding costs, as he deems necessary to effectuate the purposes of Section 22a-6b-503.

Section 22a-6b-503(k). Collection.

(1) Payment of the civil penalties assessed under this section may be required monthly, or at such time or other time intervals, or in such amounts as the Commissioner determines will most effectively limit the Department's administrative costs and further the objectives as defined in Section 22a-6b-503(d).

(2) The present value of the total civil penalty assessed, calculated at the time the notice of violation is issued, shall be held constant regardless of the timing of its collection.

STATE OF CONNECTICUT

RULES AND REGULATIONS

OF

THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

CONCERNING: ASSESSMENT OF CIVIL PENALTIES FOR VIOLATION OF MONITORING REPORT REQUIREMENTS OF ORDERS AND PERMITS ISSUED BY THE COMMISSIONER

Section 22a-6b-504(a). Title. This section shall be known and may be cited as "Civil Penalty Regulations: Violation of Monitoring Report Requirements."

Section 22a-6b-504(b). Definitions. The following definitions apply to this section:

(1) "Commissioner" means the Commissioner of the Department of Environmental Protection or his lawfully designated agent.

(2) "Composite sample" means any sample not identified as a grab sample and required in a permit or order that requires monitoring of a discharge.

(3) "Department" means the Department of Environmental Protection.

(4) "Grab sample" means any sample identified as a grab sample and required in any permit or order that requires monitoring of a discharge.

(5) "Monitoring report" means any report concerning discharges to the waters of the state by any person or municipality that a permit or order requires the person or municipality to file with the Department.

(6) "Municipality" means any metropolitan district, town, consolidated town and city, consolidated town and borough, city, borough, village, fire and sewer district, sewer district and each municipal organization having authority to levy and collect taxes or make charges for its authorized function.

(7) "Person" means any individual, partnership, association, firm, corporation or other entity, except a municipality.

(8) "State-approved, fee-basis wastewater laboratory" means any laboratory licensed or approved for the analysis of wastewaters on a fee basis by the Connecticut state agency charged with the responsibility of licensing or approving such laboratories.

Section 22a-6b-504(c). Imposition of Civil Penalties.

(1) When the Commissioner determines that a person or municipality has failed to submit a monitoring report required by a permit or order issued pursuant to §§ 25-27, 25-54g, 25-54h, 25-54i, 25-54j, 25-54k, 25-541, or 25-54aa of the General Statutes, as amended, on or before the due date or the end of the reporting interval specified in the permit or order or has submitted a monitoring report that does not include information required by such permit or order, the Commissioner may assess a civil penalty against such person or municipality pursuant to §22a-6b(a)(1) and (b) through (i), inclusive, of the General Statutes, as amended, and §22a-6b-101 of the Civil Penalty Regulations. If the permit or order calls for the inclusion of flow data in a monitoring report and the report is submitted without the required flow data, the Commissioner may treat the case as one in which no report has been submitted.

(2) Any person or municipality required by such permit or order to submit monitoring reports shall be liable for failure to meet any of the monitoring report requirements of such permit or order, notwithstanding any delegation of responsibility to another person to monitor or to complete and submit monitoring reports.

(3) (i) When the Commissioner determines that a person or municipality is liable for the imposition of a civil assessment under §22a-6b-504(c)(1), he shall cause to be delivered to the person or municipality by certified mail or personal service a letter stating that the person or municipality failed to satisfy the requirement for the monitoring report due on a specified date and indicating the nature of the failure.

(ii) Such a letter shall be sent no later than 90 days after the due date of the report in question.

(iii) The Commissioner may not impose a civil assessment under this section on any person or municipality in regard to any monitoring report unless (A) the requirements of §22a-6b-504(c)(3)(i) have been fulfilled, or (B) the 90 day period discussed in §22a-6b-504(c)(3)(ii) has not elapsed, or (C) the Commissioner had sent the regulatee a §22a-6b-504(c)(3)(i) warning letter concerning an earlier report with closely similar inadequacies to those that give rise to the current liability. For the purpose of this subsection, two reports shall involve "closely similar inadequacies" if neither is submitted at all or if both fail to include required data on flow or if both fail to include required data on one or more required analyses even if the analyses are different.

(4) The Commissioner may not impose a civil assessment under this section in regard to any monitoring report if one year or more has elapsed since the due date of that report.

Section 22a-6b-504(d). Assessment List.

(1) The Commissioner shall prepare a list of civil assessment amounts to be known as the Monitoring Report Assessment List. This list shall include assessment amounts based on the costs to persons and/or municipalities required to submit monitoring reports of grab and composite sampling, delivery for analysis, reporting, and analysis for each discharge characteristic covered by monitoring programs administered by the Commissioner. The amounts in the Monitoring Report Assessment List shall (A) for composite and grab sampling, delivery for analysis, and reporting, be based on representative costs to a sample of persons and/or municipalities required to submit monitoring reports, and (B) for each of the listed analyses, be equal to the typical charge of state-approved fee-basis water laboratories. The Commissioner shall revise the relevant parts of the List if he determines that any or all of the representative costs or charges on which it is based have changed so much that such changes cause the amounts in the Monitoring Report Assessment List to be too low to counterbalance the economic benefits of non-compliance or so high in relation to those benefits as to be unreasonable.

(2) No item in the Monitoring Report Assessment List may be included in a civil assessment calculation unless the list containing the amount has been previously published in the Connecticut Law Journal.

Section 22a-6b-504(e). Calculation of Assessments. Any civil assessment levied under this section shall be equal to the sum of the amounts from the Monitoring Report Assessment List (A) for composite sampling for each required composite sample for which no analysis is reported and for grab sampling for each required grab sample for which no analysis is reported, (B) for delivery for each report not submitted, (C) for analysis for each required analysis for which no results are reported, and (D) for reporting for each report not submitted. The Commissioner shall also consider the factors listed in §22a-6b(c) of the General Statutes, as amended, and he may, based on this consideration, lower the assessment to be levied.

Section 22a-6b-504(f). Schedule of Maximum Assessment Amounts.

(1) No amount in a Monitoring Report Assessment List shall exceed the amount in the corresponding part of the following schedule of maximum amounts.

ITEM	MAXIMUM AMOUNT (in dollars)						
	10	20	30	40	50	60	other
(A) Sampling							
1. grab sample*			X				
2. composite sample**							160
(B) Delivery***						X	
(C) Reporting****			X				
(D) Analysis*****							
General							
1. Alkalinity	X						
2. Biological oxygen demand							70
3. Chemical oxygen demand			X				
4. Total solids			X				
5. Total dissolved solids		X					
6. Total suspended solids		X					
7. Total volatile solids		X					
8. Ammonia (as N)			X				
9. Kjeldahl nitrogen (as N)				X			
10. Nitrate (as N)		X					
11. Total phosphorus (as P)			X				
12. Acidity	X						
13. Total organic carbon				X			
14. Hardness		X					
15. Nitrite (as N)		X					
16. pH	X						
Trace Metals							
17. Aluminum			X				
18. Antimony			X				
19. Arsenic				X			
20. Barium			X				
21. Beryllium			X				
22. Boron				X			
23. Cadmium			X				
24. Calcium			X				
25. Chromium VI			X				
26. Chromium total			X				
27. Cobalt			X				
28. Copper			X				
29. Gold		X					
30. Iron			X				
31. Lead			X				
32. Magnesium			X				
33. Manganese			X				
34. Mercury				X			
35. Molybdenum			X				
36. Nickel			X				
37. Potassium			X				
38. Selenium				X			
39. Silver			X				
40. Sodium			X				
41. Thallium			X				
42. Tin			X				
43. Titanium			X				
44. Vanadium			X				
45. Zinc			X				
Nutrients, Anions, and Organics							
46. Organic nitrogen (as N)			X				
47. Ortho-phosphate (as P)		X					
48. Sulfate (as SO$_4$)		X					
49. Sulfide (as S)		X					
50. Sulfite		X					
51. Bromide		X					
52. Chloride		X					
53. Cyanide				X			
54. Fluoride			X				
55. Chlorine-total residual		X					
56. Oil and grease				X			
57. Phenols				X			
58. Surfactants				X			
59. Algicides				X			
60. Benzidine					X		
61. Chlorinated organic compounds (except pesticides)							70
62. Pesticides							70
Physical and Biological Parameters							
63. Color	X						
64. Specific conductance		X					
65. Turbidity	X						
66. Fecal Streptococci bacteria				X			
67. Coliform bacteria (fecal)				X			
68. Coliform bacteria				X			
69. Other analyses					X		

*For every grab sample required by the permit or order for which no analyses are reported on or before the due date or the end of the reporting interval specified in the permit or order.

** For every composite sample required by the permit or order for which no analyses are reported on or before the due date or the end of the reporting interval specified in the permit or order.

*** For every report not submitted on or before the due date or the end of the reporting interval specified in the permit or order.

**** For every report not submitted on or before the due date or the end of the reporting interval specified in the permit or order.

***** For every analysis required by the permit or order for which no results are reported.

(2) The Commissioner has determined that the maximum civil penalties provided in this schedule will insure immediate and continued compliance and will

> protect (i) the public health, safety, and welfare; (ii) the public trust in the water, land and other natural resources of the state; and (iii) the reasonable use of property. These maximum amounts are just large enough to ensure that the economic incentive for noncompliance with monitoring report requirements will be eliminated in every case, thereby ensuring immediate and continued compliance and as much protection of the three other listed factors as would higher assessments. Because the schedule sets maximum amounts, it allows these three factors to be considered in setting lower assessments.

Section 22a-6b-504(g). Maximum Assessment. No assessment shall exceed $1000 per monitoring report not submitted in completed form on or before the due date or the end of the reporting interval specified in the permit or order.

Section 22a-6b-504(h). Limited Grounds for Non-Imposition of Assessments.

(1) The Commissioner shall not levy an assessment under §22a-6b-504 if the person or municipality assessed proves that the violation of monitoring report requirements was caused by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectable accidents; where such acts or events were occasioned directly upon the person or municipality assessed or another under contract to that person or municipality.

(2) Nothing in this section shall prohibit a person or municipality from proposing, or the Department from accepting, an agreement which protects from civil assessment liability monitoring report requirement violations caused by other acts or events not covered by subsection (1) of this Section such as contractors' or suppliers' delays.

PART V

OPERATING MANUAL
FOR THE APPLICATION
OF CIVIL ASSESSMENTS

Covering the following sections
of the Regulations of the
Department of Environmental Protection:

22a-6b-502 - Discharging Without a Permit

22a-6b-503 - Violating the Terms of An Order

22a-6b-504 - Violating the Monitoring Report Requirements of An Order or a Permit

ABSTRACT

This manual contains:

- A brief description of the Connecticut Enforcement Program
- A step-by-step guide to the application of the Water Compliance Unit's economic civil assessment regulations
- A guide for civil assessment hearing officers
- An explanation of how to use and update tools employed in levying civil assessments

IMPORTANT NOTE

THIS INSTRUCTION MANUAL IS AN INTERNAL DOCUMENT OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION. IT IS INTENDED TO HELP DEP STAFF IMPLEMENT AND OPERATE THE DEPARTMENT'S CIVIL ASSESSMENT REGULATIONS.

NOTHING CONTAINED HEREIN, IN WHOLE OR IN PART, HAS THE FORCE OF LAW. THE APPLICABLE LAW GOVERNING THE ASSESSMENT OF CIVIL PENALTIES IS TO BE FOUND IN §§22a-6b-100 et. seq. OF THE DEPARTMENT'S REGULATIONS.

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CHAPTER I

THE CONNECTICUT ENFORCEMENT PROGRAM

Over the last decade environmental law and regulation have expanded dramatically. The effectiveness of environmental law enforcement has not kept pace.

Connecticut has responded to this need with the Enforcement Act of 1973, P.A. 73-665, which provides the Department of Environmental Protection a wide range of new enforcement powers. Most notably, the law authorizes the Commissioner to impose civil assessments in such amounts as will ensure immediate, continued compliance with applicable laws, regulations, orders and permits.

The Department may impose these assessments directly, without first going through the courts. (Everything the Department does under this authority is, however, subject to subsequent court review.) This fact makes the tool practical, and credible.

To achieve these ends, the Enforcement Act has entrusted the Department with exceptional power. The Department is charged with deciding both to bring a case and with determining what to do with it. It must exercise this power with great care: it is not a judge and does not have judicial discretion. It must adhere carefully, closely, and in every case both to the specific limitations defined by the Legislature, and to its clear intent to limit the Department's discretion as much as possible consistent with achieving its primary enforcement objective.

The most important of these limitations is the use of economic standards to determine the amount of the assessment in every case. These standards ensure that no person can be charged more than that person has saved from noncompliance. This standard also ensures that the assessment's incentive will be large enough to make compliance pay (and to protect companies that have complied from unfair competition from those that have not.)

The Department's civil assessment regulations provide for assessments equal to the economic benefit a source realizes during each incremental period that it delays or avoids coming into compliance. In effect, they tax away the financial advantages of noncompliance. This benefit includes the profit the regulatee can make on the use of the money it has not invested in pollution control as long as it delays. Part III of this Volume explains these economics in detail.

The Water Compliance Unit of the Department has promulgated or proposed regulations that apply to discharging without a permit (Section 502), violating the terms of an order or permit (Section 503) -- which ensure that compliance "pays." (It pays because it saves the regulatee charges larger than the cash outlays required for compliance by an amount equal to the rate of return the source could typically earn on commercially attractive investments), and violating monitoring report requirements of orders or permits (Section 504).

This Operating Manual is designed to help Department personnel use these tools. Chapters II to IV explain how various operating issues, from warning those who may be liable, to collecting assessments from recalcitrants who seek to delay paying assessments, should be handled for each of the Section 502-504 Regulations. They also provide a series of forms and letters for use in administering each regulation. Later Chapters cover how to use and update the tools needed for setting accurate economic assessments easily.

Volume I of the Enforcement Project's Final Report provides a brief overview of the Department's new economic enforcement approach (a) in theory and (b) as it is applied in all the Department's program areas. Part I of this Volume (Volume III) provides a fuller description of its application in the Water Compliance program.

A copy of the Enforcement Act can be found in Volume I, and copies of the Water Compliance civil assessment regulations covered by this Manual are reproduced in Part IV of this Volume.

CHAPTER II

HOW TO APPLY SECTION 502 ASSESSMENTS

Section 502 authorizes the Department to impose economic civil assessments on those who are required by §25-54i (or other sections) of the General Statutes or by any DEP regulation to obtain a permit before discharging into the waters of the state, and who start or continue a discharge without such a permit. This chapter explains how to implement §502.

A. UNDERSTANDING THE SCOPE OF THE REGULATION

Basically, §502 is designed to enforce the provisions of the Clean Water Act and Department Regulations that require certain discharges to be permitted. As of August, 1975, only §25-54i of the Act clearly establishes such a requirement. It forbids a person to start a discharge after May 1, 1967 or for a municipality to start one after April 10, 1973 without first obtaining a permit from the Department. "Persons" and municipalities that started their discharges before these respective dates can be issued permits under §25-54i(e); however, permits for these earlier dischargers are not mandatory and may not have to be renewed if they are revoked or expire. There are no regulations dealing with this subject. The coverage of the permit could be changed by regulation or statute, but at present §502 COVERS ONLY POST-1967 (or 1973) DISCHARGERS.

A violation for §502 purposes is the unpermitted discharge, not the failure to apply for a permit. Thus, a company with several unpermitted separate discharges would have several §502 violations. This would be true even though all the discharges were covered in a single permit.

Section 502 liability applies to the entire time a non-permitted discharge is maintained except for:

* The time that a person is under a final order of the Commissioner (other than a civil assessment final order).

* The time before the effective date of §502.

* Any time more than two years before a violation is detected.

The basis of a §502 assessment is the cost a discharger must incur to meet the waste treatment requirements for a permit. The actual assessment in each case is the economic benefit, including profit that could be earned in alternative investments, of not making the expenditure necessary to treat the discharge adequately.

B. DETERMINING A VIOLATION

The process of detecting and proving §502 violations will be the same as current practices for detecting §25-54i(a) violations. Any discharge that violates §25-54i(a) is a candidate for a §502 assessment.

C. SENDING WARNING LETTERS

Section 502(f)(1) directs the Commissioner to send a warning letter (CA-502-W) to any regulatee that he determines is probably a non-permitted discharger. Such letters must be sent certified mail, return receipt requested.

D. APPLYING THE WAIVER PROVISION OF §502(g)(2).

Section 502(g)(2) provides a means by which a non-permitted discharger can escape part of its §502 assessment liability if:

* it moves "promptly and effectively" to qualify for a permit after detection, AND

* the Department cannot prove that it had notice of the permit requirement of §25-54i(a) of the General Statutes.

The "prompt and effective" action standard is a flexible one and gives the Department substantial discretion, with one exception. If the Department issues a first warning letter which requests preparation of a compliance plan, the discharger meets the "prompt and effective" standard if it submits a plan within 40 days that contains a compliance timetable that will allow permit issuance as soon as possible. (This protection continues until just after the Department approves the plan, whereupon the discharger is obligated thereafter to meet the deadlines in the plan.) If it fails to do so, the Department can levy an assessment for the entire period of the illegal discharge. (It can also accept a new schedule if it believes that there was a legitimate excuse for the overrun.) If no compliance plan is requested in the warning letter, the discharger must move as quickly as possible to qualify for a permit or the full assessment can also be levied.

If a discharger has had notice of the permit requirement and continues to discharge illegally, the waiver provision does not apply. The types of notice are:

* a previous §502 warning letter
* other actual written notice of the permit requirement (e.g. a certified letter mentioning the requirement)
* an application in the past for a permit for the same discharge or one similar to the discharge in question
* prior referral to the AG for discharging without a permit involving the same or a similar discharge.

If a discharger qualifies for the waiver provision, it will not have to pay all of the assessment based on pre-warning discharging or any of the assessment based on post-warning discharging. The Regulation ordinarily allows the Department to include up to two years of pre-warning letter discharging in the §502 assessment period. If the waiver period applies, the maximum pre-warning assessment period is one year. In addition, there will be no assessment for the period between warning and issuance of a permit if the discharger satisfies the two waiver requirements.

Upon detecting a non-permitted discharge, the first thing the Department should do is to check the file and determine whether any of the above notice steps have been taken. If they have not, the Department should send the regulatee a warning letter indicating that its liability may be waived if it acts promptly and effectively to comply and specifying whether or not the Department will require it to submit a compliance plan.

Finally, a decision must be made on whether to send a Notice of Violation at this stage. Even if the waiver provision applies, the Department can still assess for up to one year of past delay. IF A NOTICE OF VIOLATION IS SENT IT MUST STATE THE ASSESSMENT AMOUNT FOR THE FULL ASSESSMENT PERIOD AND THE MONTHLY ASSESSMENT FOR CONTINUING VIOLATION, EVEN THOUGH PART OF THE FORMER AND ALL OF THE LATTER MAY BE WAIVED. The assessment amount in the Notice is the maximum that can be levied in the case. Since the waiver is contingent on future "prompt and effective" action, it should not be taken into account in calculating the initial assessment amount. The assessment amount stated in the Waiver Attachment (CA-502-WA) is calculated by multiplying the monthly assessment times the number of months of pre-warning discharge up to 12 months. The waiver attachment should be sent with the Notice of Violation. It explains the waiver provision and states that only the limited assessment amount will be collected as long as the discharger continues to qualify for the waiver.

E. CALCULATING AN ASSESSMENT

Civil assessments are calculated using a common businessman's capital budgeting process. They are just large enough to make compliance attractive. Specifically, the civil assessment is calculated to be that payment which, if made at the end of each month throughout a specified period, would have the same net economic impact on a company as the expenditures necessary to qualify for a permit. While the formula for this calculation may appear complex (See "Part III - Economics" above for an explanation), it is easy to use. It has been programmed on a Wang Calculator and quickly can be made to produce assessments easily. All the Department staff need do is type in several key bits of data and push the calculator's "Go" button.

For most assessments, only four variables must be determined in order to calculate the amount due. These are:

(1) Facility costs -- a broad category of depreciable expenses that includes equipment, buildings, construction projects like lagoons, etc.;

(2) Operating and Maintenance Costs -- non-depreciable periodic costs.

(3) The typical cost of capital for the source's industry -- a rate of return just high enough to persuade a company to invest in a project;

(4) The discharger's federal income tax rate.

The precise components of these variables are spelled out in greater detail in the "Definitions" section of the Regulations (see §22a-6b-502(b)). To determine values for these variables for assessment purposes:

(1) Obtain the facility and operating costs using Section VI (A) of this manual, "Calculating the Cost of Compliance."

(2) Obtain the cost of capital for the appropriate industry using Section VI (B) of this manual, "Determining The Applicable Cost of Capital."

(3) Obtain the tax rate using Section VI (D) of this manual, "Tax Adjustments."

To calculate an assessment, write these variables onto a calculation worksheet and calculate the assessment by using these variables in the Wang Calculator (See Section VI (D) of this manual, "Operating the Wang Calculator.")

THE MONTHLY ASSESSMENT CALCULATED ON THE WANG SHOULD BE MULTIPLIED BY THE PERIOD OF DELAY IN THE ASSESSMENT PERIOD TO ASCERTAIN THE TOTAL AMOUNT OF THE ASSESSMENT FOR ACCRUED DELAY THAT WILL BE IMPOSED. THE VIOLATOR IS ALSO OBLIGATED TO PAY THE MONTHLY ASSESSMENT AMOUNT FOR EACH ADDITIONAL MONTH IT CONTINUES DISCHARGING WITHOUT A PERMIT.

The assessment period for Section 502 cases is the period of time from the start of the discharge until a permit is issued or the illegal discharge is stopped, even though some expenditures necessary to qualify for a permit may be made during that period. Such expenditures should have preceeded the start of the discharge by about as much time as they preceeded the issuance of the permit. Thus the expenditure of money prior to issuance of the permit does not result in a reduction of the assessment period in a correction of the assessment amount.

F. POSSIBLE REDUCTION OF THE ASSESSMENT

After the assessment amount has been calculated with the formula and before you send out a Notice of Violation YOU MUST DECIDE WHETHER IT SHOULD BE LOWERED AFTER CONSIDERING SEVEN FACTORS SET OUT IN §22a-6b(c) of the General Statutes.

These factors include:

(i) The amount of the assessment necessary to insure immediate and continued compliance;

(ii) The character and degree of impact the permit requirement violation has on the public trust in the air, water, and land and on the natural resources of the state, especially any rare or unique natural phenomena;

(iii) The character and degree of injury to, or interference with, public health, safety or welfare which is caused or threatened to be caused by the violation;

(iv) The conduct of the person incurring the civil penalty in taking all feasible steps or procedures necessary or appropriate to comply or to correct the violation;

(v) Any prior violations by such person of statutes, regulations, orders or permits administered, adopted or issued by the Commissioner;

(vi) The economic and financial conditions of such person;

(vii) The character and degree of injury to, interference with reasonable use of property which is caused or threatened to be caused by such violation.

You should place a memo in the file stating that you considered these factors in each case, whether or not you decide to lower the assessment. The Enforcement Act requires you to take the factors into account and you may be challenged in a hearing or in court if you fail to do so.

If you find reasons for lowering the assessment, you should notify the Director or other designated decision-maker.

G. IMPOSING AN ASSESSMENT

The decision of whether or not to impose an assessment in an individual case is made at the discretion of the Commissioner, although he may delegate this authority. Once this decision has been made, the procedure for imposition is a simple one.

Once the Department decides to proceed with an assessment, Civil Assessment Notice of Violation CA-502-NV should be sent to the violator, CERTIFIED MAIL, RETURN RECEIPT REQUESTED. The date the letter is sent out should be logged on the Civil Assessment Checklist.

As these Notices indicate, once the violator receives the Notice, it has twenty days in which to deliver a written request for a hearing to the Department. If the violator does not request a hearing within this period, the Notice of Violation automatically becomes a final order of the Commissioner. The assessment is then payable on the date specified in the Notice.

It is important that the twenty-day period after a Notice of Violation has been received be carefully monitored. If a proper request for hearing is received during this period, the procedures of the following section should be followed. If an inadequate request is received before the end of the 20-day period, the violator should be notified of the problem as quickly as possible. If no request for hearing is received, collection procedures pursuant to Section K of this manual should be followed.

H. MANAGING A HEARING

Civil Assessment Regulations §22a-6b-101(b) provide that any person receiving a Notice of Violation imposing a civil assessment may, within twenty days after receipt of the notice, request a hearing. If a source does request a hearing on a §502 assessment, follow the special procedures for the hearing which are set forth in Section V of this operating manual.

I. MITIGATING AS ASSESSMENT

Section 502(g) recites the Commissioner's authority under §22-6b(e) of the General Statutes to mitigate an assessment on the basis of factors he deems relevant, including the following:

(1) the necessity of ensuring immediate and continued compliance with the permit requirement;

(2) the impact of the non-permitted discharge on the public health, safety and welfare;

(3) the impact of the non-permitted discharge on the public trust in the air, water, land, and other natural resources of the state;

(4) the impact of the non-permitted discharge on the reasonable use of property.

YOU SHOULD INCLUDE ANY INFORMATION YOU RECEIVE THAT IS RELEVANT TO THESE ISSUES IN A SPECIAL PLACE IN THE DISCHARGER'S FILE. This is important because §502(g) also requires the Commissioner to keep a record of each case in which he mitigates a civil assessment. This record has to include, among other things, a summary of the grounds for mitigation. Public interest groups or others may challenge specific mitigations and this information will be important.

J. CORRECTING AN ASSESSMENT

One of the safeguards that was built into the regulation provides that a discharger may ask that his assessment be corrected to reflect the actual costs of compliance which he incurred in qualifying for a permit. This provision allows a discharger, after an asessment has been made, to come forward with hard evidence on the actual cost of compliance and to request a correction of his assessment. This must be done in a written petition. If the petition is received before the permit is issued, the Department can lower the assessment or lower the amount collected pending the availability of final cost data. If the petitioner is dissatisfied with the action taken, it is guaranteed a hearing after it has received its permit and can prove its actual costs.

It is important to understand that the scope of this correction procedure is fair but narrow:

(1) The only elements of the civil assessment calculus subject to correction are the figures for:

   (a) equipment cost

   (b) operating and maintenance cost

   (c) the assessment period (e.g., if the period of delay turns out to be shorter than that for which an assessment was made)

   (d) depreciable life of the equipment (if a figure other than the 15-year figure authorized in the Regulation is used).

   (e) federal income tax rate.

(2) Only "hard evidence" will be accepted to substantiate claims for correction. This means that in most cases cost estimates based on approved engineering reports or plans and specifications or actual purchase vouchers or similar invoices will be required as evidence that actual compliance costs are less than those estimated by the Department for the purpose of making an assessment. Since purchasers can easily obtain proof of purchase, such evidence should be required for all elements of cost. The reviewing engineer should carefully scrutinize correction applications which purport to substitute completely new cost of compliance figures to make sure that they include all elements of cost that were considered in making the initial assessment. (See Section VI (A) of this manual.)

The correction procedure can and should be used as an attractive alternative to the hearing process at the Notice of Violation stage. If a source questions the accuracy of a civil assessment calculation, the Department should make clear that there is a correction-as-of-right procedure which can be followed instead of the hearing process. It may further discourage threatened appeals by collecting at a lower rate than the assessment allows until the post-compliance correction hearing. (If collections then prove to have been too low, the Department can collect the amount not previously collected plus interest.)

Availability of Deferral and Variable Collection

The Department may defer a hearing on the accuracy of the amount of a civil assessment if it finds that information regarding costs that is necessary to a careful determination of the dispute is missing but will become available later. (See

§22a-6b-502(f)(3)(iii).) The Department must defer collection during any such period of deferral, which will minimize any sense of injustice the regulatee may have and avoid possible litigation. (Civil assessments are due and payable at the time that the order by which they are imposed becomes a final order of the Commissioner. However, the Department can schedule (or postpone) collection over as long a period as it thinks most beneficial to its programs and likely to impose on it the least administrative costs -- as long as it charges interest for the value of the deferral to those who receive the benefit.)

Neither the deferral of a hearing decision or delayed collection limits the assessed regulatee's ultimate liability in any way.

For a further discussion of deferral and variable collection, see Chapter V of this Part.

X. COLLECTING AN ASSESSMENT

The Department does not anticipate having any trouble in collecting civil assessments. Other agencies with similar enforcement programs have not had any trouble with collection and none is expected here. However, for the rare delinquent case, the Enforcement Act provides an easy collection procedure.

If a discharger does not pay his assessment by the date indicated on his assessment notice, send him the Collection Letter, CA-502-C. If payment is not received within three weeks of receipt by the discharger of the collection letter, the case should be turned over to Mr. Brian O'Neill who will refer the matter over to the Clerk of the appropriate Superior Court which will enforce the assessment through the Sheriff.

When an assessment is received, the check should be properly logged in and delivered to Mr. Montano in the Bureau of Administration, Office of Financial Services, (or any other person or agency subsequently designated to handle this) with the Transfer Letter CA-502/503-T. Mr. Montano will have the check deposited in the proper account and will provide you with a receipt, which should be placed in the discharger's file.

L. FORMS AND LETTERS: SECTION 502 ASSESSMENTS

The following forms and letters should be used in applying civil assessments in Section 502 cases:

- Section 502 Assessment Checklist
- General Notice of Civil Assessment Letter (CA-502/503/504 - GN)
- Assessment Warning Letter (CA-502-W)
- Civil Assessment Notice of Violation (CA-502-NV)
- Civil Assessment Final Order (CA-502-FO)
- Waiver Attachment
- Collection Letter (CA-502-C)
- Letter Explaining Factors Used in Calculating the Assessment (CA-502/503-FAC)
- Correction Letter (CA -502/503-COR)
- Transfer Letter (CA-502/503-T)
- Refund/Denial Letter (CA-502/503-R)

Copies of these forms and letters follow.

CIVIL ASSESSMENT CHECKLIST: SECTION 502

Discharger:
(Name, Address, Town)

No. ____________

Instruction Manual Reference			Initials	Date
II A,B	Date illegal discharge discovered	________	________	______
II A,B	Date discharge believed to have been commenced	________	________	______
	Proof of this date:			
II A,B	Date §502 became effective	________	________	______
II D	Warning letter CA-502-W sent on:	________	________	______
II A,B	Number of months between date warning letter sent and start of discharge:	________	________	______
II C	Discharger			

☐ had

☐ did not have

Notice under §502(g)(2).

Notice was

☐ Previous §502 warning letter. Date ________

☐ Other actual notice Date ________

Type: ____________

☐ Application for permit for similar discharge. Date ________

☐ Referral to AG for similar discharge Date ________ ________ ______

Instruction Manual **Reference**			**Initials**	**Date**
II E	Reduction In Assessment Period for Delay Beyond Regulatee's Control			
	☐ Yes ☐ No			
	Amount of reduction			
II E	Assessment variables			
	Equipment Cost:			
	Annual Operating and Maintenance Cost:			
	Cost of Capital:			
	Tax Rate:			
	Equipment Life:			
II E	Monthly Liability:			
II E	Accrued Assessment Equals:			
II E	Considered Lowering Assessment under §502(e)(4)			
	Lowering Recommended			
	☐ Yes			
	☐ No			
	Amount Lowered			
	Assessment Amount			
	Reasons Recorded and Filed			
II F	Notice of Violation CA-502-NV Sent Certified on			
II F	Date Return Receipt Returned			
II F	Date of Receipt by Source			
II F	Twenty Days After Above Date Is			

				Initials	Date
II	F	Hearing Requested Within Above Period			
		☐ Yes			
		☐ No		________	________
II	G	Hearing Held on	________	________	________
II	G	Civil Penalties Final Order Issued			
		☐ Yes			
		☐ No			
		On:	________	________	________
		Monthly Assessment	________	________	________
		Accrued Assessment Amount	________	________	________
II	F	Payment Received on Schedule:		________	________
II	F	Payment Request Letter Sent:		________	________
II	F	Collection Referred To:	________	________	________
		On:	________	________	________
II	F	Payment Sent to Financial Services		________	________
II	I	Request for Correction Received		________	________
II	I	Correction Granted ☐			
		Refused ☐			
		Amount Corrected	________		
		Reasons Recorded and Filed		________	________
		Refund Made On:	________	________	________
II	H	Assessment Mitigated			
		☐ Yes			
		☐ No		________	________
		Amount Mitigated	________		
		Amount of Assessment	________		
		Reasons Recorded and Filed		________	________
		Refund Made On:	________	________	________

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

GENERAL NOTICE OF CIVIL ASSESSMENT PROGRAM

Dear

The Department of Environmental Protection has been authorized to use civil assessments in enforcing water pollution control laws, regulations, orders and permits. The Department has consequently developed three civil assessment regulations. Section 502 for illegally discharging without a permit (effective on ____________); Section 503 for not complying with the terms of abatement orders (and permits) (effective on ____________); and Section 504 for violating the monitoring report requirements of orders and permits (effective on ________________).

All three regulations authorize the Department to impose economic civil assessments designed to take away the economic incentive to delay compliance with the covered requirements in order to (1) ensure "immediate and continued compliance" with the requirements and also to (2) protect those who comply voluntarily from being put at a competitive disadvantage compared to a small number who save money by not complying.

As the owner or operator of an actual or potential source of water pollution, you will be liable for discharging (after the effective date of §502) without a permit required by the 1967 Clean Water Act, as amended, (Chapter 474a of the General Statutes); for unexcused failure (after the effective date of §503) to comply with the terms of orders or permits issued under the Act; and for unexcused failure (after the effective date of §504) to submit complete monitoring reports as required by order or permits. The Department can also still go to court to enforce compliance by means of injunction, forfeiture and/or criminal sanction.

We are enclosing copies of the state regulations that explain your potential assessment liability for violating any of these standards. (Enforcement Regulations, §§22a-6b-100 to 22a-6b-102 general procedure and §§22a-6b-502 to 22a-6b-504.) The maximum amount you may be assessed for each month of emission or order violation is listed in the table in §22a-6b-602(d).

If you wish to discuss these regulations or have any questions, please do not hesitate to call the Water Compliance and Hazardous Substances Unit at 566-3245.

Thank you for your help in creating and maintaining a better environment for Connecticut.

Sincerely,

Robert B. Taylor
Director of Water Compliance
and Hazardous Substances

(CA-502/503/504-GN)

V-21

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Dear

The Commissioner of Environmental Protection has determined that you are discharging without a permit in violation of §25-54i of the General Statutes.

The Commissioner therefore has the option of levying a civil assessment pursuant to §22a-6b-(a) (2) of the General Statutes and §22a-6b-502 of the Department Regulations. The maximum monthly assessments that could be levied can be determined by reference to §22a-6b-502(d).

Specifically you will be deemed to have taken prompt and effective action if you

__ submit a detailed written plan of action, including a timetable, which, once implemented, will lead to the issuance of a permit as promptly and effectively as possible within 40 days of receipt of this letter.

__ accept an order issued by the Department.

__ independently take all steps necessary to qualify for a permit as promptly and effectively as possible.

If you do not meet the above standards the waiver provision will be deactivated and the Commissioner will be able to impose the full assessment against you.

If you have any questions concerning this warning letter, please contact ____________________ of the Water Compliance and Hazardous Substances Unit at 566-3245.

Sincerely,

Director,
Water Compliance and
Hazardous Substances

CA-502-W

V-22

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Office Building Hartford, Connecticut 06115

CIVIL ASSESSMENT
NOTICE OF
VIOLATION

No. 502-

TO: ____________________
(Premise Name)

RE: ____________________

____
(Premise Address)

Case No. ____________________

The Commissioner of Environmental Protection has determined that you are and/or have been discharging without a permit in violation of §25-54(i) of the General Statutes as amended. This is a Notice of Violation pursuant to §22a-6b(d) of the General Statutes and Department Regulations §§22a-6b-101 and 22a-6b-502.

VIOLATION: You initiated, created or originated a discharge into the waters of the state on or before ________ without a permit as required by Section 25-54i(a) of the General Statutes, as amended and have continued that discharge to ____________.

ASSESSMENT: You are hereby notified that you have been assessed $_____ for the period of illegal discharge to date. Furthermore, for each incremental month that you continue to discharge illegally after this date, the Commissioner will impose an additional assessment of __________ per month.

HEARING: You have a right to a hearing on this assessment. To request a hearing you must deliver to the Commissioner or the Director of Water Compliance and Hazardous Substances a written application for hearing within twenty days of the receipt of this notice.

PAYMENT: Unless a hearing is requested, this notice shall become a final order of the Commissioner twenty-one days after the date of receipt. In such an event payment of the civil assessment shall be due twenty-five days after receipt of this notice. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to:

Director, Water Compliance and Hazardous Substances
Department of Environmental Protection,
165 Capitol Avenue - Room 129,
Hartford, Connecticut 06115.

If you have any questions concerning this notice, please contact the Director at the above address or, by phone, at 566-3245. All correspondence should be identified with the Civil Assessment Notice of Violation Number (see top right-hand corner).

____________________ Signed (Director)

___/___/___ Date

SERVICE

A copy of the foregoing Notice was submitted to the above-named as indicated below:

☐ Personally delivered to ______________ ______________ Recipient's Signature ___/___/___ Date

☐ Certified mail to the usual place of business or residence. Registration No. : ____________

___/___/___ RRR

(CA-502-NV)

V-23

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING   HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT
FINAL ORDER
No. 502-

TO: ______________________
(Premise Name)

RE: ______________________
____
(Premise Address)

Case No. ____________

The Commissioner of Environmental Protection has determined, pursuant to the finding of the Hearing Officer in the civil assessment hearing held on ____________ that you are and/or have been discharging without a permit in violation of §25-54i of the General Statutes as amended. This is a Civil Assessment Final Order pursuant to §22-6b(d) of the General Statutes and Department Regulations §22a-6b-101 and 22a-6b-502.

VIOLATION: You initiated, created or originated a discharge into the waters of the state on or before __________ without a permit as required by Section 25-54i(a) of the General Statutes as amended and have continued that discharge to ______________.

ASSESSMENT: You are hereby assessed $________ for the period of illegal discharge to date. Furthermore, for each incremental month you continue to discharge illegally after this date, the Commissioner will impose an additional assessment of $ __________ per month.

PAYMENT: Payment of this civil assessment is due upon receipt of this order. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to:

Director, Water Compliance and Hazardous Substances,
Department of Environmental Protection,
165 Capitol Avenue - Room 129,
Hartford, Connecticut 06115.

APPEAL: You have a right to appeal this civil assessment final order to the Superior Court for Hartford County. This appeal must be taken within thirty days of the issuance of this order and shall be taken pursuant to the provisions of §4-183 of the General Statutes.

If you have any questions concerning this order, please contact the Director of Water Compliance and Hazardous Substances at the above address or, by phone, at 566-3245. All correspondence should be identified with the Civil Assessment Final Order Number (see top right-hand corner).

______________________	__/__/__	______________________	__/__/__
Signed (Director)	Date	Commissioner	Date

SERVICE

A copy of the foregoing Order was submitted to the above-named as indicated below:

☐ Personally delivered to ______________________ ______________________ (Recipient's Signature) __/__/__ (Date)

☐ Certified mail to the usual place of business or residence. Registration No.: ______________

__/__/__
RPD

(CA-502-FO)

V-24

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

WAIVER ATTACHMENT

The Commissioner of Environmental Protection is issuing you a ___ Notice of Violation -- ___ Civil Assessment Final Order assessing a civil penalty under §22a-6b-502 of the Department Regulations for discharging without a permit in violation of §25-54i of the General Statutes as amended.

It has been determined that you did not have notice of the permit requirement of §25-54i as required by §22a-6b-502(g)(2)(iii) of the Civil Assessment Regulations and therefore are entitled to waiver of part of the assessment if you meet the conditions of §22a-6b-502(g)(2)(ii).

You will be required to pay only $ __________ for the period of illegal discharge to date and $0 per month for each month that you continue to discharge illegally after receipt of the Notice or Order SO LONG AS YOU CONTINUE TO SATISFY THE CONDITIONS OF §22a-6b-502(g)(ii). If you do not meet those standards continuously until a permit is issued or the discharge is stopped the full assessment set out in the attached Notice or Order will be collected.

If you have any questions concerning this waiver attachment please contact the Director of Water Compliance and Hazardous Substances, Department of Environmental Protection, 165 Capitol Avenue, Room 129, Hartford, Connecticut 06115 or by phone, at 566-3245. All correspondence should be identified with the Civil Assessment Notice of Violation or Final Order Number on the attached Notice of Order.

CA-502-WA

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Subject: Case No.____________________
DEP/WC No.____________________
Notice of Violation No.____________________

Dear

The Department of Environmental Protection has determined that you were discharging without a permit in violation of §25-54i of the General Statutes and has consequently imposed a civil assessment on you pursuant to Department Regulation 22a-6b-502. The Notice of Violation or the Civil Assessment Final Order was sent to you by personal service or certified mail, and payment of the assessment was due on ____________________. Payment is now over three weeks late.

The law provides that if the assessment is not promptly paid, it may be enforced in the same manner as a judgment of the Superior Court. Accordingly, if we do not receive your payment promptly, the C missioner will file his final order with the Clerk of the Superior Court. Upon such filing, the order will have the same status as a judgment of the Superior Court and will be enforced by the Sheriff accordingly.

We expect to receive your delinquent payment no later than ________________. If we do not receive payment from you by that time, we will be compelled to institute proceedings with the Superior Court.

If you have any questions concerning this letter, please feel free to contact me at 566-3245.

Sincerely,

Director,
Water Compliance and
Hazardous Substances

(CA-502-C)

V-26

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Subject: Order No. ______________________

DEP/WC No. ______________________

Reference: Your Request of __/__/__

Notice of Violation No. ______________________

Dear

In response to your request for a written explanation of the methodology used to determine your assessment, we enclose the Department's "Calculating Civil Assessments."

The variables used to calculate your assessment in the manner described in this document are as follows. (Please refer to Enforcement Regulations §22a-6b-502(b) for definitions of these variables):

"Equipment Costs": ______________________

"Operating Costs": ______________________

"Inflation": ______________________

"Depreciable Life": ______________________

"Cost of Capital": ______________________

"Tax Rate" : ______________________

If you have any further questions concerning the assessment calculation, please do not hesitate to contact Mr. ______________ ______________ at 566-3245.

Sincerely,

Water Compliance and
Hazardous Substances Unit

(CA-502/503-FAC)

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Notice of Violation No. ________________

Dear

This letter is written in response to your inquiry regarding possible correction of the amount of the civil assessment imposed upon you.

Department Regulations 22a-6b-502(h) and 503(h) provide that a regulatee in receipt of a civil assessment Notice of Violation may petition the Commissioner for correction of a civil assessment imposed upon him any time up to six months after the Commissioner finds the regulatee has come into compliance.

These regulations require that your petition be in writing and set forth any evidence that the cost of compliance or the assessment period has been or will be less than the Commissioner had initially determined in imposing the civil assessment. Such a petition must be sent by certified mail or by personal service to the Commissioner or the Director of Water Compliance.

The Commissioner may, in response to such a petition, lower an assessment he determines was excessive. If the Commissioner takes no action in response to such a petition, or if his response is not satisfactory to you, you may obtain a hearing of right once you come into compliance or at any other time specified in a final order. Following such a hearing, the Commissioner must correct the civil assessment if and to the extent that the actual cost of compliance has been less than he had initially determined. If you are not satisfied with this decision, you may appeal it to the courts.

Any refunds to be made to you under this regulation shall be made with interest calculated at the same cost of capital rate used to make the civil assessment.

If you have any questions concerning this letter or the nature of the correction procedures under the Regulations, please contact me at 566-3245.

Sincerely,

Director,
Water Compliance and
Hazardous Substances Unit

(CA-502/503-COR)

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Source: ______________________

Notice of Violation No. ____________

Amount of Payment : $ ______________

Bureau of Administration, Financial Services
Department of Environmental Protection
Room ______

The attached check represents payment by the above-named source for a civil assessment imposed pursuant to the Department's regulations 22a-6b-100 et. seq.

☐ There remains a possibility that all or part of this check may have to be paid back to the issuer with interest. Therefore, please deposit the check into the civil assessments pending receipts fund and return a receipt of such deposit to me.

☐ The issuer of this check has no further opportunity to appeal or seek correction of the assessment that gives rise to this payment. Please deposit the check into the General Fund and return a receipt of such deposit to me.

Sincerely,

____
Water Compliance and
Hazardous Substances Unit
Enforcement Section

V-29

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

Notice of Violation No. : ________

Dear

Pursuant to the correction procedures provided by Department Regulations 22a-6b-502 (h) and 503 (h), the Commissioner has considered the evidence you have presented in your written petition for correction.

The Commissioner has

☐ determined that your assessment will be lowered by the amount of $ ______. A check for this amount, with interest, is enclosed with this letter.

☐ determined that your assessment for each month of continuous violation shall be reduced from $ _____ to $ _________.

☐ determined that the assessment will not be corrected at this time, but that only $ __________ per month will be collected until such time as a final decision on correction is made.

☐ determined that the initial civil assessment imposed upon you is correct and that your petition for correction is hereby denied.

The reason(s) for the above determination is (are):

If you have any questions concerning this letter or the correction proceedings, please feel free to call me at the Water Compliance and Hazardous Substances Unit (566-3245).

Water Compliance and
Hazardous Substances Unit

(CA-502/503-R)

CHAPTER III

HOW TO APPLY SECTION 503 ASSESSMENTS

Section 503 authorizes the Department to impose civil assessments on those who do not comply with the terms of water pollution control orders or permits. The main focus of the section is order violations, but it applies to permits as well and can be of some use in enforcing their requirements.

A. UNDERSTANDING THE SCOPE OF THE REGULATION

Section 503 can be used to enforce the terms of the full range of water pollution control orders and permits. It applies to orders issued under §25-27, and 25-54g, h, j, k or aa of the General Statutes, and to permits issued under §25-54i of the General Statutes. NPDES permits, whether in the form of state orders or permits, are covered.

The order and permit violations for which it will be used are somewhat different. In most order cases it will be used because the order recipient failed to comply with a deadline in the order's time schedule. State permits do not have time schedules, but they do have requirements for proper operation and maintenance of treatment facilities that can be enforced with §503. §503 IS NOT USED TO ENFORCE MONITORING REPORT REQUIREMENTS OF ORDERS OR PERMITS, THESE ARE ENFORCED WITH §504. It is important to note that there can be only one §503 violation per order. The violation is falling behind the order's time schedule; and the period of the violation is the length of time that the recipient is late in complying with a step of the order. The delay in each step is not aggregated, however. The final measure of the length of the assessment period is the delay in complying with the final step.

B. DETERMINING A VIOLATION

Section 503 will be used primarily for cases where dischargers do not comply with steps of orders on time and occasionally for failure to comply with permit requirements like proper operation and maintenance.

An order recipient may be assessed for any unexcused delinquency in complying with order terms. However, if a step is missed and an extension is granted, an assessment cannot be levied.

Section 503 civil assessments are proportional to the duration of the violation, thus it is important to determine how long the violation lasted, or if it is continuing, when it started. This is not a problem with order cases because the schedule deadlines clearly mark the start of the violation and completion of the required step clearly marks its end.

There is more of a problem where operating and maintenance requirements of permits are involved. When an inspector detects a case of non-operation, he may find it hard to tell (and perhaps impossible to prove) whether or not the violation was temporary or continuing. If challenged in a hearing or in court, the Department must be able to prove how long the violation lasted. For this reason YOU SHOULD NOT TRY TO USE §503 WITH PERMIT CASES UNLESS YOU HAVE SOLID EVIDENCE THAT THE NON-OPERATION CONTINUED FOR A KNOWN PERIOD OF TIME.

There is a second problem with permit O&M cases. In some cases it will be difficult to prove exactly what operating or maintenance steps were not taken. It is essential that you have this information because the costs of the omitted steps are the basis of the assessment. If you can't prove what they were, you can't define any assessment amount. The easiest cases will be those in which it is clear that the system was not operated at all (e.g. results of frequent sampling indicate no reduction in the amount of pollutants discharged; the discharger can produce no bills for chemicals necessary for operation of the treatment system; the discharger's electricity usage was the same before and after installation of the treatment system even though the system requires substantial electric power). Cases of partial or ineffective operation should probably be avoided.

A separate enforcement approach will be necessary for most O&M cases. The Connecticut Enforcement Project has developed such a program for the Air Compliance Unit. (See Volume V of this Final Report.) The Water Compliance Unit should be able to adapt this approach to its program.

Section 503, then, will allow the Water Compliance Unit to enforce compliance with its orders. It will also allow it to deal effectively with flagrant instances of noncompliance with the terms of a permit, especially for failure to operate and maintain.

C. SENDING WARNING LETTERS

Section 503 gives the Department the option of sending a warning letter to a suspected violator. A form letter (CA-503-W) may be found in the Forms and Letters Section at the end of this Chapter. Although you do not have to send a warning letter, doing so can serve several important objectives:

* Dischargers cannot claim lack of notice after receiving this letter. (Agencies are usually required to give notice within six to nine months of detecting a violation.) Sending a warning letter rather than a Notice of Violation allows the Department to delay (a) setting the assessment process in motion and (2) estimating an assessment amount that then becomes a maximum.

* The warning letter, if made credible by a consistent commitment to compliance and actual imposition of assessments in a few recalcitrant cases, will lead to prompt compliance in almost all cases, with minimum cost to both regulatees and the State. (Warning letters sent several of the most difficult Air Compliance regulatees in the spring of 1975 led to dramatic turn-arounds.) They should be especially useful when order recipients begin to fall behind on interim steps in their order schedules. In permit cases, the warnings can be used when a violation exists, but it can't be proven how long the violation has lasted or how extensive it has been.

D. MEASURING THE PERIOD OF DELAY FOR ORDERS

The amount a source has saved by not complying with the terms of an order is a direct function of how long the source has delayed, and therefore so is its civil assessment liability. This makes determination of the time a source is behind schedule critical to calculating civil assessments.

The period of delay is measured as the length of time between the dates of scheduled compliance and actual compliance. It can be measured for interim steps in the order schedule and/or for the final compliance deadline. If civil assessments are tied to the final deadline only, the Department does not have to worry about calculating cumulative delay step by step or about having to make refunds with interest in the event the source catches up some of the time it lost in earlier steps. (If the source has been assessed early in its schedule and then "catches up" all or part of the delay before the final compliance deadline, the Department is required to repay a proportionate share of the assessment with interest.)

An example may clarify this point. Consider the case of a discharger under a four step order who completed the first step six months late, the second step eight months late, the third step six months late and the fourth step twelve months late. If this discharger were issued a civil assessment for missing the first step it would pay for six months delinquency. It would not have to start paying for the second step until it was more than six months late and would pay for two months. It would not have to pay at the third step because it did not fall farther behind. However, it would start paying again when it became more than six months late on the fourth step and would pay for six months. If, on the other hand, it had maintained the same compliance pace as above until the fourth step and caught up somewhat on that step, finishing the final requirements only six months behind schedule, the Department would have had to refund 1/4 (for 2 of 8 months) of the assessment (with interest).

By waiting until the final compliance date is missed before levying a §503 civil assessment, the Unit can delay committing itself to an estimate of the assessment, avoid the need to calculate cumulative delay step by step and, in cases in which recipients catch up, avoid the need to make a refund (with interest). Section 503 allows the Department to send warning letters to probable violators, which should allow it to stimulate compliance in most cases with intermediate order steps at considerably less cost. However, especially for recalcitrant sources that do not react to warning letters, imposing an assessment at an intermediate step may be useful.

It is important to note that the assessment period covers the full period from the final compliance date to the date of actual compliance. An order recipient will make some expenditures prior to final compliance, but these should not reduce its assessment liability. If he had complied on time, he would have made these expenditures prior to the due date as well.

Since the regulations speak in terms of MONTHLY assessments, time periods of delay should be measured in months or fractions of months. For ease of calculation, monthly periods of delay should be expressed in fractional equivalents, e.g., 10 days = 10/30 = .33 months.

Excluding Delay Before The Effective Date of the Regulation

The Department is not including delay accrued before the effective date of the 503 regulation in the assessment period used in calculating civil assessments. This poses special problems during the first year or two of the regulation's use.

To measure the assessment (or violation) period for sources that were under order before the effective date, EXCLUDE THE CUMULATIVE DELAY THAT OCCURRED PRIOR TO THE EFFECTIVE DATE. For such sources, civil assessments will apply only to any incremental delinquency that develops after the effective date. For example, assume that the effective date is November 1975:

> Discharger A is on a compliance timetable which commenced on January, 1974. Step 3 of the order, requiring the start of construction, was due on December, 1974, but was not completed until March 1, 1975 (3 months behind schedule). When Step 4 of the order, requiring verification of operation, was due on January 1976, he is still 3 months behind schedule. He does not verify until April 1, 1976 and thus completes his compliance timetable three months late. However, since this source was under order before the effective date of the Regulation, his cumulative delay which occured before that date is to be subtracted from the total period of delay. Here, since there was no increment of delay after November 18, 1975 there will be no civil assessment applied to this source.

Delays Verifiably Beyond The Source's Control

The regulation's purpose is to ensure that order recipients move quickly and effectively to comply with the Department's orders. Delays that the discharger could not have foreseen or avoided and that can be verified if claimed are therefore excluded from the period of delay that defines civil assessment liability in Section 503(i). This Section provides that the Commissioner must exclude from the assessment period any delay which is caused:

- by strikes or lockouts; riots, wars, or other acts of violence; floods, hurricanes, or other Acts of God; or other equally severe, unforeseeable and uncorrectable accidents; or,
- by delays attributable to the Water Compliance Unit of the Department in excess of reasonable processing times.

None of these mandatory exclusions can become a loophole for the relatively few willful scofflaws with whom the Department must deal. Every mandatory exclusion, if claimed, can be easily verified by the Department. For example, if a discharger claims that a strike prevented him from complying, one or two phone calls can confirm whether or not there was a strike.

Unverifiable grounds for exclusion are specifically not covered by §503(i). In particular, THIRD PARTY SUPPLIER DELAY is a discretionary grounds for mitigation only. Such grounds are left in the Department's discretion because if they were mandatory exclusions they could be turned into a major loophole by recalcitrant sources willing to be less than entirely truthful. The Department generally would not be able to disprove such claims.

Although the regulation had to be drafted tightly to deny such a loophole to these few sources, the Department can grant extensions for third party delay and other reasons not covered by §503(i) when, in its judgment, such action is warranted.

If a source claims a reduction in its assessment period because of excessive process delay by the Department, the Department should compare the actual time taken in handling the case with the routine times required for handling similar cases. The Baseline study of current processing times found in Part II above can be used as a measure of the range of processing times that are "routine."

E. MEASURING THE PERIOD OF DELAY FOR PERMITS

When §503 is used to levy assessments for violating operating and maintenance requirements of permits the length of the assessment period is the time during which the requirement was either partly or entirely unmet.

It can be very difficult to prove the actual length of such a period. Evidence obtained in plant inspections can indicate failure to operation or maintain. There may be visual evidence such as malfunctioning components of the treatment system. Samples may indicate such a concentration of pollutants that the system could not have been operated properly. Records of chemical usage might indicate non-operation. However, these bits of evidence do not indicate clearly when the operating or maintenance failure began. Proof of a long period of violation may require evidence from a number of days, although not necessarily every day. There must be evidence from one or several days to infer reasonably that the system was not operated or maintained properly over the entire period.

F. LEVYING, REVISING AND COLLECTING AN ASSESSMENT

Sections 502 and 503 are complementary. The moment a discharger comes under a final order, it exchanges §502 liability for potential §503 liability. The two sections are based on identical economics, have very similar safeguards, and operate under parallel procedures. Consequently, most of the operating guidelines outlined in the last Chapter for §502 also apply to §503.

* A day's delay in obtaining a permit has the same value to the discharger as a day's delay after an order is final. The value of the delay, and the amount of the assessment are therefore calculated identically except for a slight variation in §503 permit cases. The 502 and 503

calculations require virtually the same information regarding equipment costs, operating costs, and industry cost of capital. They use the same assessment formula. See Chapter II (E) above.

- The Enforcement Act requires the Department to consider mitigation based on the same list of criteria in both cases. See Chapter II(F).

- The procedures for imposing, reviewing, collecting, and correcting assessments are all identical. See Chapter II (E,F,G,H,I, and K.)

The exception is that the cost of compliance and consequently the items plugged into the assessment formula are somewhat different in §503 permit cases. In permit cases there will be no initial capital investment to consider. The basic cost of compliance will be operating and maintenace costs and future equipment replacement costs. The calculation of costs of compliance in §503 permit cases is discussed in Section VII(A) of this manual, "Calculating the Cost of Compliance." The fact that the cost of compliance does not change in the assessment formula is covered in "Part III - Economics" above. (See also Section V II(E) of this manual, "Operating the Wang Computer.")

G. FORMS AND LETTERS: SECTION 503 ASSESSMENTS

Because §503 is so similar to §502, it is possible to use identical forms and letters for most purposes. Common forms and letters carry the identification in the lower right-hand corner, "CA-502/503-__." They are not reproduced here but will be found in the earlier 502 "Forms and Letters" section of this manual. The forms and letters needed to implement the 503 Regulations are listed below.

* Section 503 Assessment Checklist
* General Notice of Civil Assessment Letter (CA-502/503/504-GN)
* Assessment Warning Letter (CA-503-W)
* Civil Assessment Notice of Violation (CA-503-NV)
* Civil Assessment Final Order (CA-503-FO)
* Collection Letter (CA-503-C)
* Letter Explaining Factors Used in Calculating The Assessment (CA-502/503-FAC)
* Correction Letter (CA-502/503-COR)
* Transfer Letter (CA-502/503-T)
* Refund/Denial Letter (CA-502/503-R)

The CA-503- forms and letters follow.

CIVIL ASSESSMENT CHECKLIST: SECTION 503

Discharger:

(Name, Address, Town)

Order ☐ Order No. ________

Permit ☐ DEP/WC No. ________

NPDES No. ________

Instruction Manual Reference		Initials	Date
III(B)	Order Step No. ______, Scheduled for ______	________	____
III(D)	Period Of Probable Delay Up To Today	________	____
	Does Order/Permit Include A Civil Assessment Warning? Yes ☐ No ☐	________	____
III(C)	Warning Letter CA-503-W Sent On:	________	____
III(D)	Reduction In Period Of Delay For Delay Beyond Regulatee's Control? ________	________	____
	External Causes ☐		
	Unreasonable Processing Time ☐		
III(F)	Assessment Variables		
	Equipment Cost: ________		
	Annual Operating and Maintenance Cost: ________		
	Cost of Capital: ________		
	Tax Rate: ________		
	Equipment Life: ________		
III(F)	Monthly Liability ________	________	____
III(F)	Accrued Assessment Equals ________	________	____
III(F)	Considered Lowering Assessment §503(e)(4))	________	____
	Lowering Recommended Yes ☐ No ☐		
	Amount Lowered ________		
	Assessment Amount ________		
	Reasons Recorded and Filed	________	____

III(F) Notice of Violation CA-503-NV Sent Certified On:____________ ________ ____

III(F) Date Return Receipt Returned____________ ________ ____

III(F) Date of Receipt by Source__________ ________ ____

III(F) Twenty Days After Above Date Is____________ ________ ____

III(F) Hearing Requested Within Above Period ________ ____

Yes ☐

No ☐

III(F) Hearing Held On___________ ________ ____

III(F) Civil Assessment Final Order Issued

Yes ☐

No ☐

On:_____________

Monthly Assessment______________ ________ ____

Accrued Assessment Amount________ ________ ____

III(F) Payment Received On Schedule: ________ ____

III(F) Payment Request Letter: ________ ____

III(F) Collection Referred To: ________ ____

III(F) Payment Sent to Financial Services ________ ____

III(F) Request For Correction Received ________ ____

III(F) Correction Granted/Refused ☐ ________ ____

☐

Corrected Assessment:_ _ _ _ _ _ _ _

Refund (with interest): ____________

Reasons Recorded and Filed ________ ____

III(F) Assessment Mitigated

Yes ☐

No ☐

Amount Mitigated_______________

Amount Of Assessment_____________

Reasons Recorded and Filed ________ ____

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Order ☐
Permit ☐

Notice No. ________________
Order No. ________________
DEP/WC NO. ________________
NPDES NO. ________________

Dear

The Commissioner of Environmental Protection has determined that you are probably in violation of the terms of the above-mentioned order or permit in that you .

If such a violation is established, the Commissioner may levy a civil assessment on you pursuant to §22a-6b(a)(3) of the General Statutes and §22a-6b-503 of the Department Regulations. The maximum monthly assessments that could be levied can be determined by reference to §22a-6b-503(d).

If your violation is delinquency in meeting an order time schedule, your assessment liability increases in direct proportion to the extent to which you fall behind schedule. On the other hand, you can avoid all liability by catching up and meeting the final compliance deadline specified in your order schedule.

If your violation is noncompliance with other order or permit terms, your liability is again in direct proportion to the length of time during which you are not in compliance. You cannot eliminate the potential liability that has already accrued, but you can prevent its growing larger by promptly coming into compliance with the order or permit terms in question.

This letter does not mean the Department is initiating an assessment action against you for the above-mentioned noncompliance now; we hope not to have to take this action.

If you have any questions concerning this warning, please contact Mr. ________________ of the Water Compliance and Hazardous Substances Unit at 566-3245.

Sincerely,

Director,
Water Compliance and
Hazardous Substances

(CA-503-W)

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT NOTICE OF VIOLATION

No. 503-________

TO: __________________
(Premise Name)

RE: __________________
____
(Premise Address)

Order ☐ Order No. Permit ☐ DEP/WC No.__________

The Commissioner of Environmental Protection has determined that you are now in violation of the terms of the above-named State Order or Permit. This is a Notice of Violation pursuant to §22a-6b(d)of the General Statutes and Department Regulations §§22a-6b-101 and 22a-6b-503.

VIOLATION: ☐ Your order binds you to complete all steps of the order in compliance with the time schedule in the order. As of the date of this letter you are:

__________months behind schedule for step Number_____of the time schedule and are thus in violation of the terms of the order.

☐ Your permit binds you to comply with all terms and conditions embodied in it. You have failed to comply with the term or condition of the permit requiring you to __________
____.

ASSESSMENT: You are hereby notified that you have been assessed $________ for the period of non-compliance to date. Furthermore, for each incremental month that you do not comply after this date, the Commissioner will impose an additional assessment of __________ per month.

HEARING: You have a right to a hearing on this assessment. To request a hearing you must deliver to the Commissioner or the Director of Water Compliance and Hazardous Substances a written application for hearing within twenty days of the receipt of this notice.

PAYMENT: Unless a hearing is requested, this notice shall become a final order of the Commissioner twenty-one days after the date of receipt. In such an event payment of the civil assessment shall be due twenty-five days after receipt of this notice. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to,

Director, Water Compliance and Hazardous Substances,
Department of Environmental Protection,
165 Capitol Avenue - - Room 129,
Hartford, Connecticut 06115.

If you have any questions concerning this notice, please contact the Director at the above address or, by phone, at 566-3245. All correspondence should be identified with the Civil Assessment Notice of Violation Number (see top right-hand corner).

________________________ __/__/__
Signed (Director) Date

SERVICE

A copy of the foregoing Notice was submitted to the above-named as indicated below:

☐ Personally delivered to ____________ ____________________ __/__/__
Recipient's Signature Date

☐ Certified mail to the usual place of business or residence. Registration No.:____________

__/__/__
RPD

(CA-503-NV)

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT
FINAL ORDER
No. 503-________

TO: ____________________
(Premise Name)

RE: ____________________
____
(Premise Address)

Order ☐ Order No.______ Permit ☐ DEP/WC No.__________

The Commissioner of Environmental Protection has determined, pursuant to the finding of the Hearing Officer in the civil assessment hearing held on____________that the terms of the above mentioned [final order] [permit] were violated, and hereby levies a civil assessment.

VIOLATION: ☐ Your order binds you to complete all steps of the order in compliance with the time schedule in the order. As of the date of this civil assessment final order, you are: ______________months behind schedule for step Number________of the time schedule and are thus in violation of the order.

☐ Your permit binds you to comply with all terms and conditions embodied in it. You have failed to comply with the term(s) or condition(s) requiring you to____________________
____.

ASSESSMENT: You are hereby assessed $________for the period of violation to date. Furthermore, for each incremental month you do not comply after this date, the Commissioner will impose an additional assessment of $_________per month.

PAYMENT: Payment of this civil assessment is due upon receipt of this order. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to:

Director, Water Compliance and Hazardous Substances,
Department of Environmental Protection,
165 Capitol Avenue - Room 129,
Hartford, Connecticut 06115.

APPEAL: You have a right to appeal this civil assessment final order to the Superior Court for Hartford County. This appeal must be taken within thirty days of the issuance of this order and shall be taken pursuant to the provisions of §4-183 of the General Statutes.

If you have any questions concerning this order, please contact the Director of Water Compliance and Hazardous Substances at the above address or, by phone, at 566-3245. All correspondence should mention the Civil Assessment Final Order Number (see top right-hand corner.)

____________________ Signed (Director) __/__/__ Date ____________________ Commissioner __/__/__ Date

---

SERVICE

A copy of the foregoing Order was submitted to the above-named as indicated below:

☐ Personally delivered to ______________ ______________ Recipient's Signature __/__/__ Date

☐ Certified mail to the usual place of business or residence. Registration No.:______________

__/__/__ EFD

(CA-503-FO)

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Subject: Order No. ______________
DEP/WC No. ______________
Notice of Violation No. ______________

Dear

The Department of Environmental Protection has determined that you were not in compliance with the terms of a [final order] [permit] of the Commissioner and has consequently imposed a civil assessment on you pursuant to Department Regulation 22a-6b-503. The Notice of Violation or the Civil Assessment Final Order was sent to you by personal service or certified mail, and payment of the assessment was due on ______________. Payment is now over three weeks late.

The law provides that if the assessment is not promptly paid, it may be enforced in the same manner as a judgement of the Superior Court. Accordingly, if we do not receive your payment promptly, the Commissioner will file his final order with the Clerk of the Superior Court. Upon such filing, the order will have the same status as a judgement of the Superior Court and will be enforced by the Sheriff accordingly.

We expect to receive your delinquent payment no later than ______________. If we do not receive payment from you by that time, we will be compelled to institute proceedings with the Superior Court.

If you have any questions concerning this letter, please feel free to contact me at 566-3245.

Sincerely,

Director,
Water Compliance and Hazardous
Substances

(CA-503-C)

CHAPTER IV

HOW TO APPLY SECTION 504 ASSESSMENTS

Section 504 authorizes the Department to impose small civil assessments in the event that required monitoring reports are not submitted or are submitted incomplete. The assessments are based on the average cost of completing the various steps involved in preparing and submitting a monitoring report.

A. UNDERSTANDING THE SCOPE OF THE REGULATION

The federal National Pollutant Discharge Elimination System (NPDES) is administered in Connecticut by DEP and provides for the issuance of permits to dischargers. Federal law requires permittees to report periodically to DEP on a variety of characteristics of their discharges. The 1967 Connecticut Clean Water Act allows DEP to put monitoring requirements in the Connecticut orders and permits that it issues as federal NPDES permits (§25-54i(c)(4)). The monitoring requirements in each NPDES permit are thus legally binding on the permittee and can be enforced by DEP.

Section 504 has a limited function: to enable the Department to enforce the principal requirement of an effective monitoring program, i.e. the prompt submission of complete reports. As long as the Department receives such reports regularly, occasional spot-checks can ensure accuracy. The steady flow of such reports will help alert both regulatees and the Department if problems develop, and it will do so at much less cost than if the Department had to rely on a large number of expensive field inspections.

B. IDENTIFYING CASES TO WHICH ASSESSMENTS ARE APPLICABLE

A §504 civil assessment may be imposed in either of the two following situations:

(1) If a permittee fails to submit a monitoring report on time, it can be assessed. However, for the purposes of Department administration, a several week grace period will be allowed before assessments are made.

(2) If a permittee submits an incomplete report, i.e. it does not present all the discharge related information required by the NPDES permit, it can be assessed. However, since the Department's primary

concern is to receive complete reports, not to gather revenue, efforts will be made to make sure that permittees understand the monitoring requirements of their NPDES permits before levying assessments.

C. SENDING A WARNING LETTER

The Department is now planning to send computer-generated notices to regulatees when monitoring requirements are not met. It can either routinely include a warning regarding potential civil assessment liability under the terms of Section 504 in this letter or wait to send a separate warning letter later and perhaps more selectively. In either case, these warning letters should provide all the enforcement action necessary to induce prompt compliance by most regulatees, at least as long as the Department's use of the warning is credible. The warning letter is, in other words, a very simple, inexpensive, almost painless avenue to prompt compliance.*

If the Department decides to delay imposing a Section 504 assessment for more than 90 days after the day on which the delinquent report was due, it must send the regulatee a warning letter within the 90 days. This requirement (see Section 504(c)(3)) is included in the regulations in order to protect regulatees from the sudden imposition of multiple Section 504 assessments without having been given fair notice of their liability. However, this requirement does not apply if a regulatee repeats violations for which it has been sent a warning letter previously.

D. CALCULATING AN ASSESSMENT

Section 504 requires that assessments be calculated using the "Monitoring Report Assessment List." This list, which is included in this section of the manual, sets assessment amounts for various monitoring deficiencies. These deficiencies are broken into four categories: sampling, delivery of samples to a lab, reporting, and analysis.

The assessments are calculated quite simply. First, you must identify what was required in the permit and not done. Then, you add up the amounts from the list for each thing that was not done. This gives you the assessment amount. The assessment components included will be somewhat different in cases in which no report was submitted and in cases in which an incomplete report was submitted.

---

* The Air Compliance Unit has used warning letters with great and immediate success in implementing a similar civil assessment regulation that imposes liability on regulatees that do not submit progress reports required in orders.

In cases in which NO REPORT is submitted, the assessment will consist of: (1) $8 for each grab sample and $15 for each composite sample required by the permit; (2) $4 for delivery (no matter how many samples are required); (3) $7 for reporting; and (4) the appropriate amount for each analysis required by the permit.

In cases with an INCOMPLETE REPORT, the assessment will consist of: (1) $8 for each grab sample and $15 for each composite sample for which results or required flow data were not reported and (2) the appropriate amount for each analysis not reported or reported from a sample for which no flow data was reported.

Cases in which INCOMPLETE OR NO FLOW DATA, though required, is submitted, are treated as though NO REPORT was submitted. (See Section 504(c)(1)). This is because most of the required analyses are reported in terms of concentration. Concentrations are meaningless without flow data, because they give the Department no idea how much pollutant is being discharged.

§504 Assessments: An Example

An example may help clarify the assessment calculation procedure. The "X"'s indicate items not included in a hypothetical monthly monitoring report that was received on time from a source with three discharges. (Refer to the "Monitoring Report Assessment List" on page V-53 below.

Report Requirements

Discharge 001	Discharge 002	Discharge 003
Monthly composite	Monthly composite	Monthly composite
X Chromium - total	Aluminum	X Oil and grease
X Chromium - hexavalent	Chromium - total	X Total Suspended Solids
Copper	Chromium hexavalent	X Temperature
Iron	Copper	X PH
Nickel	Iron	X Flow
Zinc	Nickel	
Total Suspended Solids	Zinc	
Temperature	X Cyanide	
PH	Total Suspended Solids	
X Flow	Temperature	
	PH	
	Flow	

Applying the amounts found in the "Monitoring Report Assessment List", the assessment would include:

Sampling		Chromium total (1)	11
Grab (0)	0*	Chromium-hex (1)	11
Composite (2)	30	Copper (1)	10
Delivery (0)	0**	Iron (1)	9
Reporting (0)	0**	Nickel (1)	12
Analysis		Zinc (1)	11
		Cyanide (1)	16
		Oil and Grease	15
Total Suspended Solids (2)	16	TOTAL	
PH (2)	6	ASSESSMENT	$147***

Notes and Explanation

* There is no assessment for grab samples since none were required.

** The assessment includes amounts for the composite samples for 001 and 003, the former because no flow data were reported and the latter because no data at all were reported.

*** There were no charges for delivery or reporting. This is because usable data were delivered and reported on one sample. It would have cost little or nothing more to deliver additional samples and include more information in the report.

**** Note that there is no amount in the assessment list for temperature even though it is a required analysis. It is treated as part of the sampling because it must be done at the site of the sampling and takes little time.

***** The amounts for all the analyses for 001 and 003 and the omitted analyses for 002 are included.

It will help if, when calculating Section 504 assessments, you

* WORK CAREFULLY. It is easy to use the wrong numbers in the assessment list or to forget to include some items, especially if the permit requires the monitoring of several discharges.

* SAVE YOUR WORKSHEETS. This will help you explain what you have done to any regulatees who may call.

Lowering Assessments Based on the List

After the assessment amount has been calculated from the list and before you send out a Notice of Violation, YOU MUST DECIDE WHETHER IT SHOULD BE LOWERED AFTER CONSIDERING SEVEN FACTORS SET OUT IN §22a-6b(c) of the General Statutes.

These factors include:

(i) The amount of the assessment necessary to ensure immediate and continued compliance;

(ii) The character and degree of impact the monitoring report violation has on the public trust in the air, water, and land and on the natural resources of the state, especially any rare or unique natural phenomena;

(iii) The character and degree of injury to, or interference with, public health, safety or welfare which is caused or threatened to be caused by the violation;

(iv) The conduct of the person incurring the civil penalty in taking all feasible steps or procedures necessary or appropriate to comply or to correct the violation;

(v) Any prior violations by such person of statutes, regulations, orders or permits administered, adopted or issued by the Commissioner;

(vi) The economic and financial condition of such person;

(vii) The character and degree of injury to and interference with the reasonable use of property which is caused or threatened to be caused by the violation.

You should place a memo in the file stating that you considered these factors in each case, whether or not you decide to lower the assessment. The Enforcement Act requires you to take the factors into account and you may be challenged in a hearing or in court on this basis.

The use of economic-based assessments takes many of these factors into account automatically, but you should still give them consideration in each case.

If you find reasons for lowering the assessment, you should notify the Director or other designated decision-maker.

E. IMPOSING AN ASSESSMENT

Section 504 assessments are levied in much the same way as those under §§502 and 503. All three regulations incorporate the procedural provisions of §22a-6b-101. Section 504 has several unique provisions that must be kept in mind as well.

If a permittee has violated the monitoring report requirements of its permit for one or more reports and an assessment is to be levied, the following steps should be taken:

(1) Make sure that the warning provisions of §504(c)(3) are met:

- a CA-504-W letter was sent within 90 days of the report or reports in question, or
- the permitee has continuously not submitted reports or submitted incomplete reports for a period of time and received a CA-504-W warning letter for one or more of these reports, or

- less than 90 days have elapsed since the due date of the report.

(2) Make sure that one year or more has not elapsed since the due date of the report in question.

(3) Obtain the proper authorization for imposing an assessment.

(4) Fill out and send the permittee a copy of the Notice of Violation, CA-504-NV, by certified mail.

(5) If 20 days have passed since the permittee received the Notice of Violation and you have not received a request for a hearing, the Notice has the status of a final order of the Commissioner. At this point, the right to a hearing has expired and the assessment is due in 5 days.

(6) If a written hearing request was received within the time limit, follow the procedures in the next section, "Managing a Hearing". If a request for a hearing was received on time but otherwise did not meet the requirement of §101(b) -- e.g., it was made by phone, etc. -- notify the person as quickly as possible of the changes needed.

(7) If payment is not received by the 25th day after receipt of the Notice, send the permittee the Collection Letter, CA-504-C.

F. MANAGING A HEARING

The Civil Penalty Regulations, §22a-6b-101(b), provide that a person may, within 20 days after receipt of the Notice of Violation, deliver to the Commissioner by certified mail or personal service a written application for a hearing. Given the relatively small size of most §504 assessments and the undisputable nature of most such violations (a report was submitted or it was not, a report was complete or it was not, etc.), there are likely to be very, very few applications for hearings.

If a permittee does request a hearing, you should follow the hearing procedures that are outlined in Chapter V of this manual. If a hearing is held, and the Commissioner affirms the finding of a violation, you will be notified by the hearing officer that you can proceed with the collection procedures outlined below.

G. COLLECTING AN ASSESSMENT

Particularly since Section 504 assessments are small, the Department should not have any trouble with collection. Other agencies with similar enforcement programs have not had any trouble. However, for the rare delinquent case, the Enforcement Act provides an easy collection procedure.

If a permittee does not pay his assessment by the date indicated on his assessment notice, send him the Collection Letter, CA-504-C. If payment is not received three weeks after the source has received the Collection Letter, the case should be turned over to Mr./Ms.__________________. He/she will refer the matter over to the Clerk of the appropriate Superior Court which will enforce the assessment through the Sheriff.

When an assessment is received, the check should be logged and delivered to Mr. _______________ in the Bureau of Administration, Financial Services, with the Transfer Letter that is attached at the end of this section (CA-504-T). Mr. __________ will have the check deposited in the proper account and will provide you with a receipt for the assessment check which should be placed in the permittee's file.

H. UPDATING THE ASSESSMENT LIST

Section 504(d)(1) requires the Department to revise all or part of the "Monitoring Report Assessment List" from time to time when it finds that the costs of monitoring have changed enough to make the assessment list amounts so unreasonably high or low that they no longer serve to encourage compliance with monitoring requirements effectively.

In order to satisfy this requirement, you must first determine whether the relevant prices and costs have changed significantly since the most recent Assessment List was published. This should be done by re-surveying a group of three to five permittees and three to five labs that had been surveyed in the most recent previous revision. The current costs and prices can be compared to the previous ones for the same permittees and labs to see whether they have changed significantly.

Such price checks should be made every year or so. They should be made at more frequent intervals if there are indications that monitoring costs are changing dramatically. The following are examples of such indications: substantial inflation or deflation in the economy in general; substantial inflation or deflation in the cost of key elements in monitoring such as chemical reagents, lab technicians, etc.; and information volunteered by permittees or labs about their costs.

If one of these cost checks indicates that there have been significant changes in the costs of monitoring, a full cost survey should be run. This should be conducted using methods that are at least as reliable as those used in preparing the initial List. The initial methodology is described in the CEP file document, "Developing the Monitoring Report Assessment List." Particular attention should be given to obtaining information from as many state-approved, fee-basis water labs that handle all basic analyses as possible, and to surveying as representative a sample of permittees as is feasible.

The list of labs used in selecting those for the initial sample came from the Clinical Laboratory Section - Laboratory Division, Connecticut State Department of Health. This list may be obtained from Mr. Earl Thompson (or his successor) at the Department of Health.

I. MITIGATING AN ASSESSMENT

Section 504 does not have a provision regarding mitigation. However, the Commissioner is empowered by §22a-6b(e) to mitigate any assessment on the basis of factors he deems relevent, including the following:

(1) the necessity of ensuring immediate and continued compliance;

(2) the impact of the violation on the public health, safety and welfare;

(3) the impact of the violation on the public trust in the air, water, land and other natural resources of the state;

(4) the impact of the violation on the reasonable use of property.

YOU SHOULD ADD ANY INFORMATION YOU RECEIVE RELEVANT TO THESE ISSUES TO THE REGULATEE'S CASE FILE.

If you feel mitigation is justified, please contact the Director.

J. MONITORING REPORT ASSESSMENT LIST

The first Monitoring Report Assessment List will be found on page V-53. It will be used by the Department in calculating civil assessments for monitoring report requirement violations pursuant to §22a-6b-504(d)(1) of the proposed Regulations.

The List has been prepared in accordance with the requirements of that section on the basis of a cost survey of companies with permits that have been monitoring and a price survey of state approved fee-basis water laboratories.

The List can be modified by the Commissioner in accordance with conditions and procedures set out in the Regulation (§22a-6b-504(d)(1)) to keep it in line with changing costs.

As required by §22a-6b-504(d)(2), this List, and subsequently any modified Lists, will be published in the Connecticut Law Journal before they are used.

MONITORING REPORT ASSESSMENT LIST
(September 1976)

Monitoring Requirement	$	Monitoring Requirement	$
(A) Sampling			
1. grab sample*	8	32. Magnesium	9
2. composite sample**	15	33. Manganese	9
(B) Delivery***	4	34. Mercury	18
(C) Reporting****	7	35. Molybdenum	11
		36. Nickel	12
(D) Analysis*****		37. Potassium	10
		38. Selenium	16
General		39. Silver	11
		40. Sodium	9
1. Alkalinity	4	41. Thallium	13
2. Biological oxygen demand	20	42. Tin	14
3. Chemical oxygen demand	15	43. Titanium	16
4. Total solids	8	44. Vanadium	17
5. Total dissolved solids	8	45. Zinc	11
6. Total suspended solids	8		
7. Total volatile solids	7	Nutrients, Anions, and Organics	
8. Ammonia (as N)	11		
9. Kjeldahl nitrogen (as N)	15	46. Organic nitrogen (as N)	15
10. Nitrate (as N)	7	47. Ortho-phosphate (as P)	8
11. Total phosphorus (as P)	10	48. Sulfate (as SO_4)	6
12. Acidity	4	49. Sulfide (as S)	6
13. Total organic carbon	24	50. Sulfite	7
14. Hardness	5	51. Bromide	10
15. Nitrite (as N)	7	52. Chloride	5
16. pH	3	53. Cyanide	16
		54. Fluoride	11
Trace Metals		55. Chlorine-total residual	5
		56. Oil and grease	[illegible]
17. Aluminum	12	57. Phenols	12
18. Antimony	12	58. Surfactants	12
19. Arsenic	14	59. Algicides	26
20. Barium	12	60. Benzidine	36
21. Beryllium	15	61. Chlorinated organic compounds (except pesticides)	36
22. Boron	16	62. Pesticides	32
23. Cadmium	11		
24. Calcium	8	Physical and Biological Parameters	
25. Chromium VI	11		
26. Chromium total	11	63. Color	4
27. Cobalt	12	64. Specific conductance	6
28. Copper	10	65. Turbidity	4
29. Gold	7	66. Fecal streptococcal bacteria	24
30. Iron	9	67. Coliform bacteria (fecal)	13
31. Lead	11	68. Coliform bacteria	12
		69. Other analyses	12

* For every grab sample required by the permit or order for which no analyses are reported on or before the due date or the end of the reporting interval specified in the permit or order.

** For every composite sample required by the permit or order for which no analyses are reported on or before the due date or the end of the reporting interval specified in the permit or order.

*** For every report not received on or before the due date or the end of the reporting interval specified in the permit or order.

**** For every report not submitted on or before the due date or the end of the reporting interval specified in the permit or order.

***** For every analysis required by the permit or order for which no results are reported.

K. FORMS AND LETTERS: SECTION 504 ASSESSMENTS

The following forms and letters should be used in applying the assessments for violations of monitoring report requirements.

- Section 504 Assessment Checklist
- General Notice of Civil Assessment Letter (CA-502/503/504-GN)
- Assessment Warning Letter (CA-504-W)
- Civil Assessment Notice of Violation (CA-504-NV)
- Civil Assessment Final Order (CA-504-FO)
- Collection Letter (CA-504-C)
- Transfer Letter (CA-504-T)

Copies of these forms and letters may be found on the following pages, with the exception of the General Notice Letter which may be found in the §502 Forms and Letters section.

CIVIL ASSESSMENT CHECKLIST: SECTION 504

Discharger: ____________ Order No. ____________
Name

____________ DEP/WC No. ____________
Address

____________ NPDES NO. ____________
Town

Instruction Manual Reference

Initials Date

IV(B) Due Date of Report: __/__/__

☐ Not Submitted ☐ Incomplete

IV(E) Computer Warning Sent On: ____________

IV(E) Adequate Report Received Within Two Weeks

Yes ☐ No ☐

IV(C,E) Warning Letter CA-504-W Sent On: ____________

IV(C,E) Warning Letter CA-504-W Sent For Same Violation on Earlier Report

Yes ☐ No ☐

IV(D) Assessment Amount From List ____________

IV(D) Considered Lowering Assessment §504(e)

IV(D) Recommend: ☐ Lowering by ____________

No Lowering ☐

IV(E) Notice of Violation Sent Certified On ____________

IV(E) Date Return Receipt Returned ____________

IV(E) Hearing Requested Within 20 days.

Yes ☐ No ☐

IV(F) Hearing Held On ____________

IV(F) Civil Assessment Final Order Issued On: ____________

The Order requires:

IV(G) Payment Received On: ____________

On Schedule ☐ Late ☐

IV(G) Collection Letter CA-504-C Sent On: ____________

IV(G) Collection Referred To: ____________ On ____________

IV(I) Assessment Mitigated?

Yes ☐ No ☐

Amount Mitigated ____________

Amount of Assessment ____________

Reasons Recorded and Filed

V-56

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
Date

Notice No. ______________
Order No. ______________
DEP/WC No. ______________
NPDES NO. ______________

Dear

The Commissioner of Environmental Protection has determined that you failed to submit a monitoring report on: ____________ that fully satisfies the requirements of your permit in that the report: ____

____

The Commissioner may levy a civil assessment pursuant to §22a-6b(a)(1) of the General Statutes and §22a-6b-504 of the Department's Regulations. The maximum monthly assessments that could be levied can be determined by reference to §22a-6b-504(f).

If you take prompt action to come into compliance, the Department may decide not to impose this assessment. We hope not to have to take such action.

If you have any questions concerning this warning, please contact Mr. ____________________ of the Water Compliance and Hazardous Substances Unit at 566-3245.

Sincerely,

Director,
Water Compliance and
Hazardous Substances

(CA-504-W)

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT
NOTICE OF
VIOLATION

No. 504-__________

To: ______________________
(Premise Name)

____
(Premise Address)

Re: Order No. ______________

DEP/WC NO. ____________

NPDES______________

The Commissioner of Environmental Protection has determined that you are now in violation of the terms of the above-mentioned (NPDES permit) (Order). This is a Notice of Violation pursuant to §22a-6b(d) of the General Statutes and Department Regulations §§22a-6b-101 and 22a-6b-504.

VIOLATION: Your (permit) (order) binds you to comply with the monitoring report requirements embodied in it. You have failed to comply with the requirements in that you failed to submit a report on or before ______________ ☐; you submitted a report that did not include all the required data ☐.

ASSESSMENT: You are hereby notified that you have been assessed $__________ for this failure.

HEARING: You have a right to a hearing on this assessment. To request a hearing you must deliver to the Commissioner or the Director of Water Compliance and Hazardous Substances a written application for hearing within twenty days of the receipt of this notice.

PAYMENT: Unless a hearing is requested, this notice shall become a final order of the Commissioner twenty-one days after the date of receipt. In such an event payment of the civil assessment shall be due twenty-five days after receipt of this notice. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to:

Director, Water Compliance and Hazardous Substances
Department of Environmental Protection,
165 Capital Avenue -- Room 139,
Hartford, Connecticut 06115

If you have any questions concerning this notice, please contact the Director at the above address or, phone, at 566-3245. All correspondence should be identified with the Civil Assessment Notice of Violation Number (see top right-hand corner).

______________________ / /______
Signed (Director) Date

SERVICE

A copy of the foregoing Notice was submitted to the above-named as indicated below:

☐ Personally delivered to ______________ ______________________ / /______
Recipient's Signature Date

☐ Certified mail to the usual place of business or residence. Registration No.:______________

/ /______
RPD

(CA-504-NV)

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

CIVIL ASSESSMENT FINAL ORDER

No. 504-

To: ____________________ Re: Order No. ____________
(Premise Name)

____________________ DEP/WC No. ____________
(Premise Address)

NPDES NO. ____________

The Commissioner of Environmental Protection has determined, pursuant to the finding of the Hearing Officer in the civil assessment hearing held on ____________ that the monitoring requirements of the above-mentioned (NPDES permit) (order) were violated, and hereby levies a civil assessment.

VIOLATION: Your permit binds you to comply with the monitoring report requirements embodied in it. You have failed to comply with the requirements in that you failed to submit a report required on or before ____________ ☐; you submitted a report that did not include all the required data ☐.

ASSESSMENT: You are hereby assessed $____________ for this violation.

PAYMENT: Payment of this civil assessment is due upon receipt of this order. Payment should be made by check to the order of "Conn. Department of Environmental Protection" and should be delivered to:

Director, Water Compliance and Hazardous Substances,
Department of Environmental Protection,
165 Capitol Avenue -- Room 129,
Hartford, Connecticut 06115.

APPEAL: You have a right to appeal this civil assessment final order to the Superior Court for Hartford County. This appeal must be taken within thirty days of the issuance of this order and shall be taken pursuant to the provisions of §4-183 of the General Statutes.

If you have any questions concerning this order, please contact the Director of Water Compliance and Hazardous Substances at the above address or, by phone, at 566-3245. All correspondence should be identified with the Civil Assessment Final Order Number (see top right-hand corner).

____________________ Signed (Director) / / Date ____________________ Commissioner / / Date

SERVICE

A copy of the foregoing Order was submitted to the above-named as indicated below:

☐ Personally delivered to ____________________ ____________ Recipient's Signature / / Date

☐ Certified mail to the usual place of business or residence. Registration No.: ____________

/ / RPD

(CA-504-FO)

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
(Date)

Subject: Order No.
DEP/WC NO. ______________
Notice of Violation No. ______________
NPDES No. ______________

Dear

The Department of Environmental Protection has determined that you were not in compliance with the monitoring report requirements of an NPDES permit or order of the Commissioner and has consequently imposed a civil assessment on you pursuant to Department Regulation 22a-6b-504. The Notice of Violation or the Civil Assessment Final Order and the consequent civil assessment was delivered to you by personal service or certified mail, and payment of the assessment was due on ____________. Payment is now over three weeks late.

The law provides that if the assessment is not promptly paid, it may be enforced in the same manner as a judgment of the Superior Court. Accordingly, if we do not receive your payment promptly, the Commissioner will file his final order with the Clerk of the Superior Court. Upon such filing, the order will have the same status as a judgment of the Superior Court and will be enforced by the Sheriff accordingly.

We expect to receive your delinquent payment no later than ________________. If we do not receive payment from you by that time, we will be compelled to institute proceedings with the Superior Court.

If you have any questions concerning this letter, please feel free to contact me at 566-3245.

Sincerely,

Director
Water Compliance and
Hazardous Substances

(CA-504-C)

V-60

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

____
(Date)

Permittee: ______________________

Notice of Violation No. ______________________

Amount of Payment: $ ______________________

Mr. (Anthony Montano)
Bureau of Administration, Financial Services
Department of Environmental Protection
Room ______________

Dear (Mr. Montano),

The attached check represents payment by the above-named source for a civil assessment imposed pursuant to the Department's regulations 22a-6b-101 et. seq.

☐ There remains a possibility that all or part of this check may have to be paid back to the issuer with interest. Therefore, please deposit this check into the civil assessment pending receipts fund and return a receipt of such deposit to me.

☐ The issuer of this check has no further opportunity to appeal or seek correction of the assessment that gives rise to this payment. Please deposit the check into the General Fund and return a receipt of such deposit to me.

Sincerely,

____
Water Compliance and
Hazardous Substances
Enforcement Section

(CA-504-T)

CHAPTER V

HOW TO CONDUCT HEARINGS IN CIVIL ASSESSMENT CASES

Dischargers who receive notices imposing civil assessments have 20 days from the date of receipt to request an administrative hearing on the assessment action. Contested assessments are likely to be extremely rare. This Chapter discusses the likely scope of any such hearings, the role of the hearing examiner, and the issues and types of evidence that will be important in hearings under §§502, 503 and 504.

THE SCOPE OF HEARINGS

The scope of civil assessment hearings and the burden on the Department will depend in large part on the issues raised in the request for a hearing. There are two basic issues that can be raised in civil assessment hearings:

* Whether the underlying violation of the Clean Water Act, Department regulations, an order, or a permit in fact occurred. Questions will vary for each civil assessment regulation, because the underlying violations addressed by each differ.

* Whether the civil assessment was calculated properly.

The Department can and should make every effort in the pre-hearing period to get the person requesting a hearing to state his grounds for contesting the assessment as specifically and in as much detail as is possible. This will enable the Department to dispose of all relevent issues at the hearing efficiently. If a hearing request asserts broadly that the Notice of Violation is invalid, the Department may have to show at the hearing that the underlying violation occurred and that the assessment was properly calculated in all respects. In contrast, if the hearing request can be narrowed to specific reasons why the Notice of Violation is claimed to be invalid, the parties can focus more efficiently on the real issues.

The Department can use the Rules of Practice to help define issues for hearing. Section 22a-6b-8-2(a) directs that answers to orders be both specific and detailed, and that facts or assertions in an order that are not specifically denied are deemed admitted. If the Department is faced with a vague request, it can ask the hearing officer -- before hearing -- to require a more detailed answer and to strike vague claims.

Constitutionality And Other Legal Issues

Persons assessed may challenge the constitutionality of the Enforcement Act or the legality of the Civil Penalty Regulations in a hearing. These questions are decided in court, not in the administrative hearing room. Nevertheless, the conduct of hearings can have an important bearing on the final outcome of such challenges. No case can get to court without first going through a hearing. The statute and regulations have been carefully designed to avoid constitutional and other legal objections. IF THE HEARING OFFICER MAKES CERTAIN THAT THE DEPARTMENT HAS FULFILLED ALL THE REQUIREMENTS OF THE ACT AND REGULATIONS, SUCH LEGAL CHALLENGES AND SUBSEQUENT RISKS WILL BE KEPT TO A MINIMUM IF NOT AVOIDED COMPLETELY.

SECTION 502
ASSESSMENTS

The following paragraphs discuss specific issues and related evidence that will be critical in §502 hearings.

Liability For An Assessment

There are two aspects to the liability question:

(1) Is or was there a discharge to the waters of the state (started after May 1, 1967 if by a person or after April 10, 1973 if by a municipality)?

(2) Is or was a valid permit issued for the discharge in question under §25-54i of the General Statutes?

On the question of the existence of a discharge, the Department can produce:

- Reports or testimony by Department field inspectors or engineers showing the date of initial detection of the discharge.

- Correspondence from or notes on conversations with the discharger indicating the date the discharge was initiated.

- Testimony by the discharger, if the issue is not contested.

- Evidence such as building permit applications that show the date of construction of the facility that is or was the source of the discharge, in cases of new facilities.

- Reports or testimony by Department field inspectors or engineers that show that the discharge was not in existence on some date after the 1967 or 1973 deadline in cases of new discharges from old facilities.

- Rejected applications for §25-54i permits.

The issue of a valid permit can be settled easily by checking the permit files and having an engineer testify that he checked the files and found no permit record.

Correct Calculation of Civil Assessments

If the Department must defend the specific assessment levied, it will have to show that it calculated the economic assessment correctly and that it followed all other assessment calculation requirements in the statute and regulation.

With regard to the economic assessment calculation, the Department must establish these facts:

(1) That the number of non-permitted discharges identified is reasonable. This number in part determines the maximum assessment that can be levied. Neither the Clean Water Act nor §502 sets a rule for determining what are separate discharges, leaving for the Department to define the number of discharges according to administrative practice. That practice is subject to a reasonableness test, however. If the Department is not careful to identify all legitimately separate discharges, it will find in some cases that the civil assessment large enough to eliminate the economic benefit of maintaining a non-permitted discharge is unnecessarily greater than the statutory minimum. Testimony by Department field inspectors

and engineers that have inspected the non-permitted discharger and documents such as inspection reports, engineering reports, etc., can be used to show that the number of discharges identified is correct.

(2) That any flow data, discharge analyses, plant layouts and other information used in estimating the cost of compliance were accurate. This can be done with (1) reports of sampling and analysis and (2) testimony by those who prepared layout descriptions, etc.

(3) That the Department's cost estimating procedures, if used, were properly carried out. The Department should produce a copy of any cost curves used to calculate the assessments, plus back-up materials from Chapter VI of this Part, and a file of any calculations that have been done to update the curves. Special note should be made of the sources upon which the cost curves were drawn. If ad hoc estimates were used, the engineer making them should testify and/or introduce the records of his work into the record.

(4) That any cost estimates prepared by representatives of the non-permitted discharges were reviewed and that any modifications made in those estimates for assessment calculation were reasonable. This can be done with testimony by the engineers who reviewed the cost estimates. Price lists used in correcting cost estimates should be presented as should memos reporting on phone checks of prices with equipment manufacturers, etc.

(5) That the inflation rate, cost of capital, equipment life figures and tax rate used to calculate the assessment are reasonable. The hearing officer's task is to judge (a) whether the inflation rate was selected and calculated in accordance with §502(b)(8) using either the Wholesale Price Index or another recognized index, (b) whether the non-permitted discharger is a member of the class covered by the cost of capital figure used in the Department's calculations, (c) whether the average equipment life of the control equipment, if the Department has used a figure different from the 15-year period specified in the regulation, is reasonable, and (d) whether the tax rate used is reasonable.

The Department should present a copy of the materials on inflation, cost of capital, and equipment life in Part III of this Volume, together with testimony explaining how they were used in the particular case at issue.

(6) That the Department made an accurate assessment calculation using the above numbers. The hearing officer's job is to judge whether the Department properly calculated the monthly assessment. The Department should present a copy of the WANG calculator print-out recording the calculation of the assessment level. A copy of the detailed explanation of the formula used to determine assessments found at the beginning of the Economics Part of this Volume should also be included in the record.

(7) That the Department considered the seven factors spelled out in §22a-6b(c) of the General Statutes (regarding whether or not to levy the economics-based assessment, or a lower one). The first and most heavily stressed of the seven factors is "immediate and continued compliance." Because the economics-based assessment is designed to be the lowest that will generally ensure such compliance, the Department should show, if it decides to lower the assessment, that the factors that led it to do so are either particularly compelling or that a lower assessment will not slow compliance in the case at hand. The Department should present any information used in evaluating the seven factors.

(8) The length of the violation. The hearing officer must determine whether the Department has adequately demonstrated when the non-permitted discharge began or was first assessable. A showing that the source was in operation at the time claimed and was discharging without a permit will generally be adequate. The Department must also show that the assessment period does not include any time prior to the effective date of §502 or more than two years prior to the date the violation was detected and the regulatee so notified. (The types of evidence that can be presented to show the date of the start of the non-permitted discharge are outlined above in the discussion outlining the scope of liability for an assessment.) The continuing nature of the discharge can be shown by testimony of Department field inspectors or engineers who inspected the discharge, reports on samples taken, etc.

After the Department presents its evidence on length of violation, the regulatee may try to show that the Department has included in the assessment period unreasonably long processing time. Proof that the assessment period does not include delay that is the Department's fault should not be difficult to make. The Department can produce testimony or statements to the effect that a report was processed as quickly as is generally done with reports of similar complexity and that a processing time of roughly the same duration was figured into the order schedule. The information found in Part II of this Volume, the "Baseline," provides a firm basis for such claims.

Deferring Calculation Of An Assessment

The Department may take the position at the hearing that not enough information is available at that time to calculate the monthly assessment with reasonable certainty, and it may accordingly request that the question of assessment calculation be deferred until more data becomes available (e.g., from estimates based on an approved engineering report). In this situation, the hearing officer may make findings regarding other issues (such as the existence of an illegal discharge) in the case and postpone any decision regarding the amount of the assessment under §502 (f)(3)(ii).

Deferring part of a hearing under §502(f)(ii) postpones a final decision by the Commissioner, and thus also postpones a regulatee's right to appeal. Postponement provides valuable time for the Department to gather cost information to demonstrate the reasonableness of a proposed assessment. This extra time also brings costs: the Department cannot collect any assessment without a final decision. Furthermore, the maximum assessment that can later be collected for the entire time of violation prior to the reconvening of the hearing and issuance of a civil assessment final order is $25,000. These conflicting pressures -- more time at the cost of delayed collection and a reduced maximum -- will probably work to keep the Department's use of postponement in balance. Nevertheless, since excessive delay can seriously impair a regulatee's right to appeal, the hearing officer must be sensitive to granting unnecessary delay. Generally, (1) waiting until an engineering report is available is reasonable, (2) delays over a year are suspect and require strong justification.

Correction of Assessment

The hearing officer should also be made aware of the correction procedure in §502(h). This enables a discharger that is assessed to obtain adjustment of any final assessment if it can demonstrate that its cost of compliance or the length of the assessment period were less than initially assumed to be the case in calculating the assessment. The correction procedure works to the benefit of the regulatee by authorizing adjustment of an otherwise final assessment up to six months after final compliance. If overpayments have been made, refunds are guaranteed with interest at the cost of capital rate used in calculating the assessment. This procedure means that an error in the estimate of the cost of compliance used in calculating the initial assessment cannot have any long term negative impact on the discharger. The availability of this procedure allows the hearing officer to give the Department more leeway in calculating the monthly assessment and determining the assessment period, since both can be corrected later. It is a useful alternative to the hearing deferral device.

SECTION 503
ASSESSMENTS

The following paragraphs discuss specific issues and related evidence that will be critical in §503 hearings.

Liability For An Assessment

There are two aspects to the liability question

(1) Is there an abatement order or permit in effect?

(2) Has any term of the order or permit been violated?

The first question is a simple one to answer. The Department need only produce a copy of the order or permit in question and testimony or a signed statement from the engineer in charge of the case to the effect that the order or permit has not been revoked, etc.

The second question is also rather simple to answer in the most common type of case involving failure to comply with the compliance time schedule specified in an order. The schedule generally requires submission to the Department of reports or verifications that actions have been taken by specific dates. The Department need only produce testimony or a statement by the engineer in charge of the case that the report or verification was not received on time. In cases in which a verification was submitted, but the step was not actually done, proof is easy because these steps can generally be checked easily in the field. A field inspector's testimony or statement that the verified step had not in fact been completed would be adequate.

In cases involving violations of permit terms (primarily operating and maintenance requirements) the problems of proof will be more difficult. The Department must show that the requirement was violated, and for how long. It has been suggested that §503 only be used for permit O&M cases when there is clear evidence of continuing non-operation or maintenance. To make such a case, the Department might produce (1) sampling information indicating a continuing level of pollutants in the discharge so high as to be inconsistent with effective treatment and/or (2) chemical purchase records or energy bills indicating that enough key chemicals or power had not been purchased to operate the treatment system. Alternatively, it might produce testimony or statements to the effect that frequent inspections had been made over a period and that illegal discharges were being made throughout the period. Other relevant evidence could include correspondence, memos from phone conversations, and so on.

Correct Calculation of Civil Assessments

Whether the amount of the civil assessment is correct or not turns on exactly the same issues and should be handled in exactly the same way as a challenge to a §502 assessment amount would be. See the discussion of this above.

SECTION 504 ASSESSMENTS

The following paragraphs discuss the issues and related evidence that will be critical in §504 hearings.

Liability For Assessments

There are four aspects to the question of §504 liability:

(1) Whether the challenger is subject to a valid order or permit that includes a monitoring report requirement.

(2) whether the regulatee failed to comply with that requirement in such a way as to make it liable for a §504 assessment.

(3) whether the regulatee received a timely warning letter as required by §504(c)(3).

(4) whether the assessment was levied within one year of the due date of the report(s) in question.

To deal with the first aspect of this question, the Department can produce the permit or order in question and testimony or a statement by the engineer in charge of the case to the effect that the permit or order was in effect and valid at the time the violation occurred.

For the second aspect of §504 liability, the Department can produce any incomplete reports received and compare them with the requirements in the permit or order. It can show that no report was received with the testimony or a statement from the person responsible for logging in reports for the discharge in question.

The question concerning the warning letter can also be readily answered.

* The Department must show that the §504 Notice of Violation was received by the regulatee within 90 days of the due date of the report(s) in question. This can be done with the return receipt from the Notice of Violation which is sent certified mail and the permit or order; OR

* The Department must show that the regulatee received a §504 warning letter within 90 days of the due date of the report(s) in question. This can be done with the return receipt from the warning letter and the order or permit; OR

* The Department must show that, although the assessment was not levied within 90 days and no warning letter was sent concerning the report in question, the regulatee had adequate notice from a prior warning letter. This requires a showing that a warning letter was sent concerning a previous report and the report and all intervening reports had the same basic shortcoming(s) as the report(s) covered by the assessment. The Department must produce a copy of the warning letter, the report(s) covered by it and all subsequent reports up to the report(s) causing the

assessment. It must also produce a record of the inadequacies of each report in this series to show that all failed to provide flow data OR all failed to report analysis for any other parameter covered in the Assessment List. If no reports were submitted between the warning letter and the assessment, the Department should produce testimony or a statement from the person responsible for logging in the reports to that effect.

* The Department must show that less than one year elapsed between the due date of the report in question and the receipt by the challenger of the Notice of Violation. The order or permit, and the Notice of Violation return receipt should be sufficient for this.

Correct Calculation Of An Assessment

Section 504 assessments are calculated simply by identifying the inadequacies of a report and adding up the appropriate assessment components from the "Monitoring Report Assessment List." To show proper calculation, the Department need only:

(1) identify the separate deficiences (sampling delivery, analysis, reporting) for which assessments are being made;

(2) produce the Assessment List used in the calculation and testimony or a statement by the person in charge of updating the list to the effect that the list used was the correct one;

(3) produce a worksheet matching the deficiences with entries in the Assessment List and summing the separate assessments.

(4) show by testimony or statements that the seven factors of §22a-6b(c) of the General Statutes were considered in regard to the question of possibly levying a lower assessment than is called for by the Assessment List. Statements or testimony by the persons responsible for setting the assessment amount in the Notice of Violation should be sufficient.

CHAPTER VI

HOW TO USE AND UPDATE THE TOOLS EMPLOYED IN LEVYING ECONOMIC CIVIL ASSESSMENTS

This Chapter explains (1) how to obtain the information you will need to calculate economic civil assessments and (2) how to use the Wang Calculator to simplify the process of calculating assessments. It is divided into four major sections:

- Section A: Determining the Cost of Compliance
- Section B: Determining the Applicable Cost of Capital
- Section C: Using Inflation Indexes
- Section D: Estimating the Source's Income Tax Rate
- Section E: Operating the Wang Calculator

SECTION A

DETERMINING THE COST OF COMPLIANCE

Determining the cost of compliance is a critical step in calculating economic civil assessments. The cost of compliance is broadly defined in the civil assessment regulations to include virtually every expense a discharger will have in meeting treatment requirements established by the Department. If those costs are not accurately determined, the economic rationality of the civil assessment program will be lost. This would make the assessments ineffective in some cases, and open the Department to charges of arbitrary penalty setting which could lead to serious legal problems.

It must be possible to determine the cost of compliance quickly and easily as well as accurately. The process must not take too much staff time: the Water Compliance Unit is already overburdened.

The civil assessment regulations provide for a costing approach that will provide accuracy at low administrative cost. Moreover, this approach is backed by a provision in the regulations that guarantees the regulatee the right to have the assessment corrected once it comes into compliance -- and any overassessment returned with interest. This allows the Department to make relatively crude estimates initially when it does not have much information to go on.

This Section discusses:

* alternative procedures that can be used to determine the cost of compliance. Different procedures will be most useful depending on:

  - how much information is available, chiefly a function of how near the regulatee is to compliance. (It will be easier to estimate costs after plans and specs are available than when the treatment approach has not yet been defined.)

  - what costs must be estimated, chiefly a function of what steps are required to comply. This in turn depends on the nature of the water pollution problem. Treating metal finishing wastes is quite different from limiting runoff from a construction site.

- sources of cost information and the short-cuts which may be used (1) to check cost information submitted by regulatees and (2) to estimate costs when little or no cost documentation is available.

PROCEDURES FOR DETERMINING THE COST OF COMPLIANCE

The Water Compliance Unit will have to use a variety of different procedures to calculate the cost of compliance. The types of water pollution control facilities or measures it requires vary widely. Furthermore, the required installation and/or operation and maintenance requirements can differ significantly even among otherwise similar pollution control cases. To facilitate the determination of the appropriate cost of compliance for a civil assessment case and to achieve the best accuracy for each particular case, the Department can require the submission of vouchers, contractors' bid estimates, and preliminary and detailed engineering estimates. In lieu of such cost documentation, the Department can estimate the probable costs based on completed engineering designs and plans. When neither cost information nor plans are available, the Department can make rough estimates using generalized costs and technological designs for particular types of water pollution control cases. The probable accuracy of the cost of compliance determination in individual cases will vary greatly depending on what and how much cost and design information is available to the Department.

The facility costs* and annual operation and maintenance expenses vary greatly for different types of water pollution control installations or procedures. The facility costs include equipment costs, installation costs (including labor and materials for piping, electrical wiring, site preparation, and other activities), engineering services, contractors' fees, and other items. The annual operation and maintenance costs include such items as chemicals, electricity, lab analysis, labor for operation and repair, spare parts, and sludge hauling.

The following subsections outline what you should do if you must estimate the cost of compliance if good regulatee cost estimates are available, if only preliminary data is available, and if you must do all the work yourself.

---

* "Facility costs" is the term used in the §§502 and 503 regulations to include all capitalized costs.

A. If Cost Estimates Are Available

If the Department can get the regulatee to provide detailed cost estimates, especially if backed by equipment lists and component by component price quotes, its task will be enormously eased. It can require the regulatee to give it such information under the regulations. However, the regulatee must be reasonably far along in the process of complying to be able to provide such information.

If such information is available:

* Verify the completeness of the cost itemizations based on your knowledge of the pollution control facilities generally required in such cases and adjust for the dimensions of this particular case.

* Spot-check current prices of major items with manufacturers, suppliers, contractors, or consultants.

* Compare the submitted costs, either for the entire pollution control project or for individual cost items, with the costs for comparable items in other cases.

* Estimate the costs of any omitted items using methods similar to those for verifying submitted costs and add them to the regulatee's estimate.

* Add on an appropriate percentage as a margin of error to hedge against the probability of under-estimation.

  - Add 10 percent to contractors' bid estimates.

  - Add 20 percent to detailed engineering estimates based on finalized plans and specifications.

  - Add 30 percent to "ball-park" engineering estimates developed in conjunction with the preparation of preliminary control/treatment designs.

B. If Approved Plans and Specifications or Engineering Reports Contain Little or No Cost Information

(1) If the regulatee does not provide much cost information, first consider whether to prepare an itemized estimate of the cost of compliance or rely on less case-specific alternatives. Base the decision on the following criteria:

- * Whether the cost items -- either facility costs and/or operation and maintenance costs -- are specified in such a way as to facilitate an itemized cost estimate;

- * The time required to prepare an itemized estimate; and

- * The availability of quick-estimating devices, such as cost curves and tables for the particular type of pollution control requirements.

  - -- If an itemized estimate can be prepared with reasonable effort and administrative cost, determine the cost of compliance using the steps outlined in B(2) and B(3).

  - -- If a quick-estimating device is available for a case in which an itemized estimate would entail substantial administrative costs, use the quick-estimating device as outlined in C(2) below.

  - -- If no quick-estimating device is available in a case in which an itemized estimate would entail substantial administrative costs, use either of the approaches outlined in C(3) and C(4) below for determining the cost of compliance.

(2) To estimate the facility costs based on approved engineering reports or plans:

- * Determine current prices for the specified equipment, instrumentation, excavation and other facility cost items by:

  - referring to published cost curves, or tables,

  - calling manufacturers, suppliers, contractors, and consultants, and

  - using cost information compiled in Department files for the same or similar items installed in other pollution control facilities.

* Determine an appropriate add-on for installation. It will fall between 50 and 250 percent of the purchase price of equipment and instrumentation. How large this add-on percentage should be depends on how much piping, electrical work, and site preparation are required in each individual case. Relatively simple projects with few automatic controls and easy access to the outfall location will have relatively low installation costs.

* Determine the costs of any additional building which may be required on a square foot basis.*

* Add-on appropriate amounts for any other installed cost items -- e.g., easements for piping to a discharge location.

* Review your work to make sure you have not left out any major cost items.

(3) To estimate the annual operation and maintenance costs based on engineering plans, either:

* Prepare an itemized estimate by:

  - listing the particular expense items in the individual case, and

  - determining the current cost of each item.

* Estimate the annual costs as a percentage of the installed capital costs using a factor typical for similar pollution control facilities.

* Estimate the annual costs by analogizing to the experience of sources with similar pollution control requirements.

(4) Add 20 percent to estimates prepared from detailed plans and specifications and 30 percent to estimates prepared from approved engineering reports to hedge against the possibility of underestimation.

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* For most cases, a cost of $20/sq. ft. (in 1975 dollars) will suffice for estimating building costs. This is an add-on rule of thumb often used by consulting engineers. If you know that the building costs will be exceptionally high or low, adjust the figure accordingly.

C. No Regulatee Cost Data Available

If little or no cost of design work is complete or available, your job will be more difficult.

(1) Determine whether any quick-estimating devices -- i.e., cost curves or tables -- are available for either the facility costs or the annual operation and maintenance costs for the particular type of pollution control technology. If such aids are available, make an initial estimate of the cost of compliance as outlined in C(2) below. If no curves or tables are available, estimate the costs by analogizing to similar pollution control cases (C(3)) or by making a rough original control design or prescription for the particular source and estimating its cost (C(4)). If quick estimating aids are available for only part of the total cost of compliance -- i.e., for either the facility costs or the annual operating and maintenance costs; or for only a portion of the required pollution control facilities or measures -- use the curves or tables for that portion of the total cost for which they are available and estimate the remainder using C(3) or C(4).

(2) To use cost curves and tables:*

- Determine the appropriate values for the key cost variables in the particular case.
- Derive the facility costs and/or annual operation and maintenance costs from the curves and tables.

An example will help illustrate this approach: A metal finishing plant with an untreated 60 gpm flow containing both cyanide and chrome fails to submit an engineering report as required in an order to install a treatment facility. A set of curves and tables is available (see "Sources of Cost Information," below) which allows Department staff to estimate the installed costs of metal waste treatment facilities, both with and without cyanide and/or chrome treatment modules, quickly and reliably. To use the curves and tables, it is necessary to determine:

a. the flow volume in gallons per minute of the cyanide rinses, the chrome rinses, and the total metal waste stream, and

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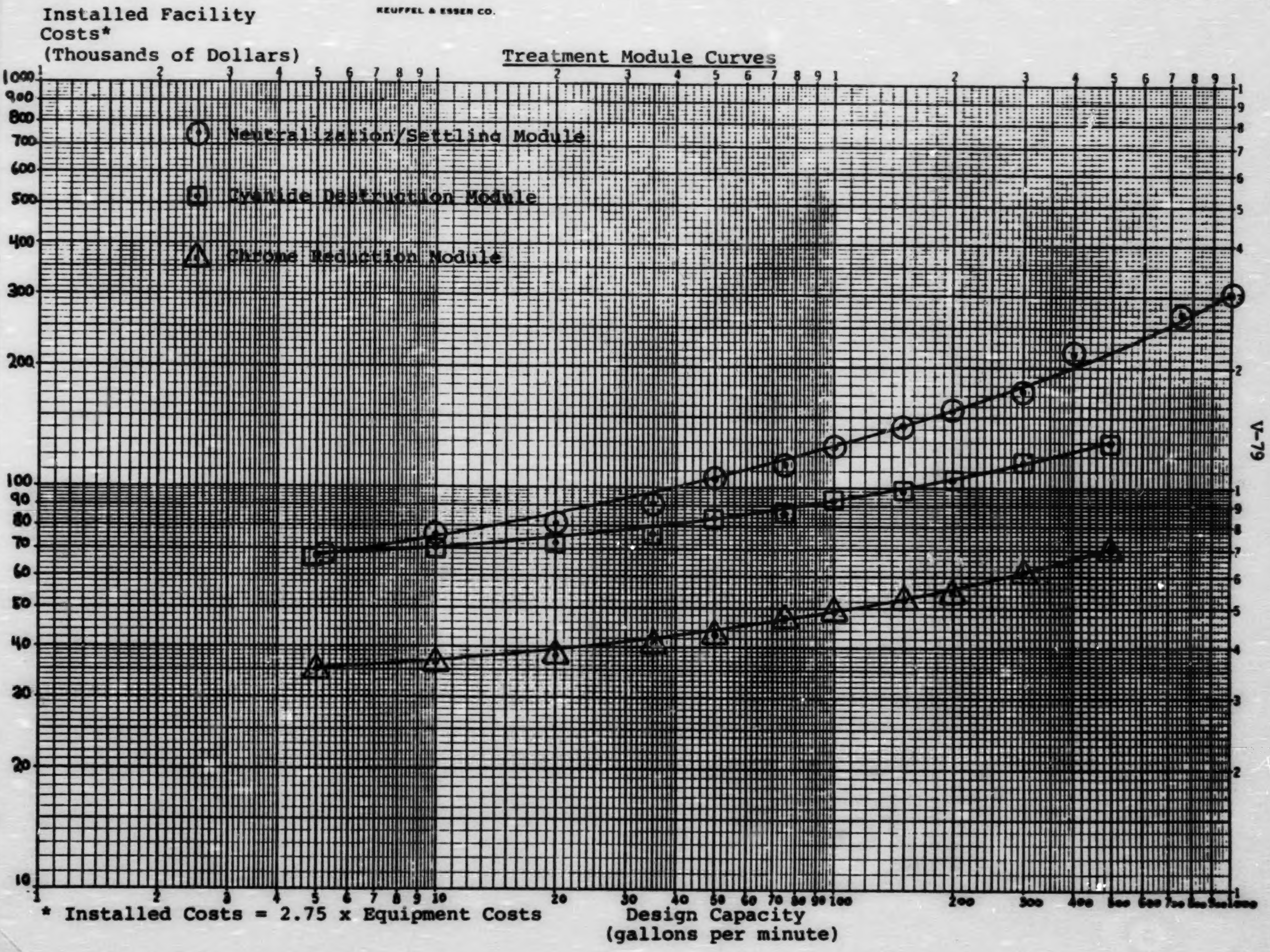
* The rationale behind the development and use of costing curves and tables is discussed in Part III of this Volume. The Appendices of this Chapter outline the methodology of developing cost curves.

b. which sludge dewatering mechanism is appropriate -- for the purpose of costing based on two criteria: the flow volume and the availability of land for a sand drying bed. If a sand drying bed is appropriate, determine the number of different metals and the total concentration of metals in the waste stream.

If the cyanide rinse flow is 10 gpm and the chrome rinse flow is 5 gpm, the following cost curves will allow Department staff to estimate that the installed treatment facility, not including provisions for sludge dewatering, would be $212,000. The $212,000 figure is the sum of the costs of each treatment module:

Module	Flow Rate	Installed Cost
Cyanide Destruction	10 gpm	$ 69,850
Chrome Treatment	5 gpm	35,350
Neutralization/Settling	60 gpm	107,000
		$ 212,200

Treatment Module Curves



* Installed Costs = 2.75 x Equipment Costs

The staff would then go on to estimate the cost of sludge dewatering from cost tables available for this function. If sufficient land is available for a sand drying bed and if the total concentration of the four metals in the waste stream is 40 mg/liter, the installed costs of the sludge dewatering mechanism would be $13,820. Thus the total estimated installed cost for the metal waste treatment facility is $226,020.*

The CEP, working closely with and relying heavily on Mike Harder of the Water Compliance staff, has only developed a few such curves and tables for Water Compliance. This work has, however, confirmed that this approach will work. Additional cost curves and tables can be developed as needed, for some types of cases.

(3) To estimate the cost of compliance based on the costs in one or more similar cases:

- identify one or more similar cases;
- identify the important differences between the assessment and reference cases that may have a significant impact on costs; and
- adjust the costs from the reference cases accordingly to reflect the particular characteristics of the assessment case. To determine the appropriate amount of any adjustments or the cost of any unique cost items in the assessment case,
  - contact manufacturers, suppliers, contractors, or consultants, or
  - refer to available curves, tables, and other sources of current price information for the particular cost items.

(4) To estimate the cost of compliance based on an original control design, it is necessary first to determine the cost items in the particular case and, second, to estimate the costs for each item.

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* From the Sludge Dewatering Tables:

A. If the flow rate is less than 200 gpm and if sufficient land is available, use the costs for a sand drying bed for calculating the cost of compliance.

B. Flow (F) = 60 gpm
Concentration (C) = 40 mg/l
Number of Metals (N) = 4

The Installed Cost of a Sand Drying Bed =
$5.76 (F) (C-N) + 1375
$5.76 (60) (40-4) + 1375
$13,820

- To estimate the FACILITY COSTS:
  - -- determine a probable control design adequate for the particular source;
  - -- identify the equipment and other capital cost components which require specific pricing as distinct from those which may be subsumed in an installation add-on percentage;
  - -- define the size, capacity, material, and other basic specifications required in order to obtain current prices for the individual cost components;
  - -- determine the costs of the specified items by:
    - using equipment and construction industry cost curves and tables;
    - calling manufacturers, suppliers, contractors, and consultants; or
    - using cost information from similar cases;
    - referring to cost lists kept in the unit.
  - -- select an appropriate percentage add-on of between 50 and 250 percent of the purchased equipment cost to cover installation materials and labor -- including piping, electrical wiring, and site preparation -- engineering services, contractors' overhead and profit, and contingencies; and
  - -- estimate additional building costs on a square foot basis.
- To estimate OPERATING AND MAINTENANCE COSTS:
  - -- itemize the annual expenses required to ensure adequate continued operation and maintenance, and
  - -- determine the annual amount of each expense item by:
    - using information about current labor rates, chemical costs, electricity charges, and other costs;
    - using itemized accounts of the operation and maintenance expenses of similar pollution control facilities;

- calling chemical suppliers, electrical power companies, sludge haulers and other suppliers of operating and maintenance materials and services.
- using established contractors' add-ons where available.

Staff Responsibility For Calculating Costs

The Department will probably have to impose very few assessments each year. And, when it does, the staff will usually either be able to work from regulatee cost information or use cost curves or tables. However, a few difficult cases will from time to time require the Department to invest considerable staff time in order to make a reasonably reliable cost estimate.

Estimating costs, especially when there is little client cost information available, requires engineering skill and experience. Since only a small case load is at all probable, the only way the Water Compliance Unit can develop such staff skills would be for it to have two of its engineers handle all such cost estimating. (We suggest two be assigned this job to cover for sickness, absences from the office on field inspection, and staff turnover.)

SOURCES OF COST INFORMATION

There are four major types of sources of cost information which may be used for determining the cost of compliance:

(1) Manufacturers, suppliers, and distributors of pollution control systems, equipment, and services;

(2) Information on costs in other pollution control cases;

(3) Curves, tables, and other information contained in Pollution Control, Chemical Engineering, and other trade or industrial journals, EPA publications, independent research documentation, and other literature; and

(4) Curves, tables, and other quick-estimating aids developed specifically for civil assessment costing.

This section outlines how Unit engineers can estimate costs using each of these sources of information.

(1) Manufacturers and Suppliers

Most manufacturers, suppliers, and distributors of pollution control equipment, materials, and services; most construction contractors and sub-contractors; and most consulting engineers are willing to supply current price information or to suggest sources of information upon request. Due to the current high rate of inflation, few publish price catalogues; rather they prefer to quote prices case-by-case using in-house pricing guidelines.

To minimize the administrative burden of phone calls to manufacturers, suppliers, and distributors, the Department should try to keep current price lists and cost information from other cases on file. Keeping a list of supplier contacts will also help when surveys are required.

Similar Case Costs

Cost data from similar cases is an excellent and easy basis upon which early cost estimates may be built. Unfortunately, the Department has very little cost data now in its files. It should begin routinely to collect such information from its regulatees. It has the authority to require its regulatees to provide cost estimates and/or actual cost information at every step of the enforcement process. Doing so would both create the data base to make cost estimation by analogy possible and it would allow the Department to work from the regulatee's data sooner in more cases than would otherwise be possible. When working from regulatee data, the Department could use the cost information on file for analogous cases or processes as one means of doublechecking the reliability of the regulatee's estimates.*

Published Sources

There is a significant and rapidly growing body of published material that can eliminate much of the work of the cost-estimating. This section lists only a few key sources; the Department engineers assigned responsibility for making cost estimates will have to keep on top of developments in this area.**

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* When using cost data from analogous cases or processes, Department engineers should adjust for the inflation (deflation) that has occurred between the date of the comparison case data and the current. Either the Marshall and Swift Equipment Cost Index or the Chemical Engineering News Record Indexes are particularly good yardsticks for this purpose.

** The CEP has deposited an extensive collection of such materials with the Water Compliance Unit's library.

Total Facilities Costs

Because water pollution abatement controls typcially must be tailored to fit the pollution-producing process closely, there are relatively few cost curves or generalizable cost tables that can be used for estimating the total installed facility costs for either particular types of pollution control problems or control technologies.

There are, however, several important exceptions. Several cost studies have been done for municipal sewage treatment facilities. In addition, EPA sponsored the development by the ICARUS Corporation of the BICEP program (Brief Input Cost Estimating Program) for the costs of sewage treatment plants and the SICEMS program for estimation of the cost of sewer systems. Further, some of EPA's Development Documents used in preparing Effluent Guidelines (and other studies) include curves which relate total installed costs for actual installations to key operating parameters.*

Equipment Module Costs

It is much easier to find reliable cost curves and tables for components or "modules" commonly used in the many, varied customized water pollution control facilities than it is for the facilities themselves. Computer programs have been developed which give the installed costs of equipment modules and a few types of pollution control systems. See for example, the following description of the computer program developed and owned by ICARUS Corporation: Capital and Operating Costs of Pollution Control Equipment Modules - Volume I - User Guide, EPA-R5-73-023a, July, 1973. Volume II contains curves plotted for most of the modules using data points generated by the program.

Control modules cost curves and data are also published periodically in trade journals and chemical engineering texts and treatises.**

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* See, e.g.,EPA, Development Document...for Metal Finishing Segment of the Electroplating Point Source Category, EPA-440/1-75/040-a, April, 1975, p. 143.

** See, e.g., Max Peters and Hans Timmerhaus, Plant Design and Economics for Chemical Engineers (New York: McGraw-Hill, 1967) pp. 435-510, 760-66; and K. M. Guthrie, "Capital Cost Estimating", in Chemical Engineering, March 24, 1969, pp. 114-142.

Especially during or after periods of rapid inflation, the cost estimates taken from such sources must be corrected for inflation. The Marshall and Stevens equipment cost index is a reliable index to use for this purpose. Similarly, estimates must be adjusted uniformly to include installation and other indirect costs that may not be included in some module cost data.*

Operations and Maintenance

Operating and Maintenance cost estimates can usually be derived from the same sources used to estimate either total facilities or module costs. They are typically expressed as a percent of installed capital costs. See, for example, the operation and maintenance cost analyses in the EPA Development Documents for specific industrial categories.

Cost Curves

It is possible to develop cost curves for broad classes of cases. Such curves would relate easily measured or typically readily available variables (such as the flow of water requiring treatment and the concentration of particular pollutants in the flow) to the cost of control. Once such curves were available, all that Department staff would have to do to estimate costs would be to plot the flow/concentration data on a graph and read off the results. The time required for estimating costs would be cut to a tiny fraction of what it would otherwise be.

These cost curves would usually be for particular types of pollution, e.g. metal wastes. They would be drawn assuming that control began outside the regulatee's plant, i.e. that control was to be accomplished with add-on equipment rather than tailored process adjustments. Such an add-on approach to control would be more expensive in most cases than individually tailored approaches -- but (1) the approach would accurately reflect major differences between the amounts different regulatees would have to pay to comply and (2) any overcharge the Department collected could be returned after the mandatory post-compliance correction guaranteed in the regulations.

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* See Peters and Timmerhaus 99-116 and Guthrie 114-116.

Industry- or module-specific curves would also be possible, and some curves might well be based on plots of particular case costs rather than those developed from an engineering model. Mike Harder of the Water Compliance engineering staff and the CEP developed a prototype set of model-based cost curves that will allow Department staff to estimate installed facilities costs in metal waste cases (roughly 40 percent of the recent caseload). Separate curves allow estimates for sources with and without cyanide and/or hexavalent chrome among their metal wastes. See Chapter II of Part III [and the Appendix] of this Volume for a fuller treatment of these curves.

SECTION B

DETERMINING THE APPLICABLE COST OF CAPITAL

The cost of capital is defined as the price demanded by tomorrow's suppliers of capital. Simply, it is the aggregate cost of borrowing or otherwise raising money. Also by definition, it is the minimum rate of return required to justify a capital investment.

The cost of capital is an important variable in the civil assessment calculation for two reasons. First, it is used to discount the costs of compliance to a present value; and, second, it is used to determine the assessment amount that, if imposed monthly over the full life of a project, will equal the present value of the costs of compliance. In both cases it works as a measure of the value to the regulatee of money over time -- how much it costs to make an expenditure now rather than later (and *vice versa*).

This Section (1) discusses how to determine the appropriate cost of capital rate for a particular case and (2) outlines how to update the table of cost of capital rates used in setting individual assessments from time to time.

DETERMINING THE COST OF CAPITAL FOR AN INDIVIDUAL REGULATEE

To find the cost of capital for an individual source,

A. Locate the regulatee in the alphabetical listing of manufacturers in the *Connecticut Manufacturing Directory* and note the two-digit code next to its name. This is the Standard Industrial Classification code number. A sample source entry follows at the end of this explanatory section.

B. If a source is not listed by name in the alphabetical listing of the *Directory*, find the Standard Industrial Classification which most closely approximates the type of regulatee with which you are concerned. A description of these classifications is found at the front of the *Connecticut Manufacturing Directory*, and is reproduced at the end of this section. Note the two digit code.

C. Once you have the two-digit code, find the cost of capital from the following cost of capital table:

INDUSTRY-WIDE COST OF CAPITAL AVERAGES (1975)

SIC CODE	TYPE OF INDUSTRY	COST OF CAPITAL
19	Ordnance & Munitions	11.5 %*
20	Food & Kindred Products	11.46
21	Tobacco Manufacturers	11.28
22	Textile Mill Products	11.57
23	Textile Apparel Products	10.79
24	Lumber and Wood	10.69
25	Furniture	12.26
26	Paper and Allied Products	11.17
27	Printing and Publishing	11.67
28	Chemicals & Allied Products	11.86
	Industrial Chemicals & Synthetics	11.37
	Drugs	12.65
29	Petroleum and Coal Products	11.96
30	Rubber and Misc. Plastic Products	11.28
31	Leather Goods	11.17
32	Stone, Clay, Glass & Concrete Products	11.57
33	Primary Metals Industry	10.98
	Non-Ferrous Metals	10.73
	Iron and Steel	11.17
34	Fabricated Metal Products	11.76
35	Machinery, except Electrical	12.26
36	Electric and Electronic Equipment	11.57
37	Transportation Equipment	12.06
38	Instruments and Related Products	12.83
39	Other Manufacturing Products	
	Non-Durable	11.96
	Durable	10.69

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* Because no debt/equity ratio for this industry was available, this figure assumes the average debt/equity ratio for all industries.

UPDATING THE COST OF CAPITAL TABLE

The cost of capital figures in the preceding table represent industry-wide averages derived from a weighted cost of capital methodology. This methodology will be explained in some detail so that the table can be updated on an annual or semi-annual basis to reflect changes in capital structures and capital markets.

To derive a weighted cost of capital for any industry requires:

(a) the industry debt/equity ratio

(b) the industry cost of debt

(c) the industry cost of equity

Finding The Debt/Equity Ratio

The best source for determining the ratio between debt and equity for any industry is the Federal Trade Commission's Quarterly Report for Manufacturing Corporations. To calculate the debt/equity ratio for the various standard industrial classifications listed in the cost of capital table:

(1) locate the balance sheet for a given SIC code

(2) add up all liabilities other than current liabilities (this is the debt component)

(3) locate the item "stockholders' equity"

(4) calculate the ratio between debt and equity

EXAMPLE:

Debt: From the balance sheet for "Stone, Clay, Glass Products" which is reproduced at the end of this section, add up all liabilities other than "current liabilities"

932
2951
915
35
4833 = DEBT

Equity: From the balance sheet for Stone, Clay, Glass Products, find the entry, stockholders' equity.

Stockholders' equity = 11,064 = EQUITY

Debt/Equity Ratio

		%	
DEBT	4833	30	(15,897 divided by 4833)
EQUITY	11064	70	(15,897 divided by 11064)
TOTAL	15897	100	

For this industry, the debt/equity ratio is .3/.7

The FTC Quarterly Reports may not include all the industry groupings that are needed to complete the cost of capital table. If an industry is not included in the FTC report, there are two alternative sources to use:

(1) Financial Dynamics, a business looseleaf publication, gives annual financial analyses for selected industries.

(2) The Internal Revenue Service's Corporation Income Tax Returns, a publication which includes industry-wide balance sheets.

Reproductions of the balance sheets from these two sources follow at the end of this section. Note that although the IRS publication date is 1969, an updated 1974 version will be available soon. If you use either of these alternative sources of debt and equity structure, calculate the debt/equity ratio in the same manner as described above.

Finding The Cost of Debt

The cost of debt varies with (1) changes in national interest rates and (2) the risk of lending to each particular debtor. Except for a small number of extremely risky situations, most of the variation in the cost of debt is a function of the first of these factors.

Consequently, for most cases the Department should simply assume that a commercial regulatee has an "A" bond rating, the statewide industrial average, and apply the interest rate then prevailing on "A"-rated bonds to determine that regulatee's debt cost. The cost of debt to most companies does not vary widely from the rate charged "A"-rated firms. Assuming an "A" rating in other words, does not cause the resulting assessments to be significantly inaccurate. It still allows the debt cost component of the cost of capital to reflect the major swings in interest costs, and it simplifies calculating the cost enormously.

All a member of the Department need do is determine what interest "A"-rated corporate bonds yield in the market at the time. This information is available in the financial press (e.g. Barron's), over the phone from a bank or brokerage house, or from Standard and Poor's monthly bond summary.

Very small or obviously risky companies may have a significantly higher cost of debt. In these cases, the Department can require the company to report what it has had to pay for recent loans, check its claims with the creditor, and use this figure for the cost of debt. This is clearly a much more time-consuming option than simply applying the cost of issuing "A"-rated bonds.

Note that the cost of debt is the cost of raising debt now, not the average cost of all a firm's outstanding debt. Large firms with long-term bonds issued years ago at 2 and 3 percent rates of interest will have a low average cost of debt, but they will not be deceived by this fact. They know that they will have to be paying current rates for any new investments they make.

However, the time cost of debt must be adjusted for the income tax deduction for interest payments allowed by the tax code. Thus, it will be necessary to multiply the interest rate paid on "A" bonds by the reciprocal of the regulatee's income tax rate (in most cases assumed to be 48 percent for corporations: see Part III, Chapter IV). After 48 percent of every dollar of interest cost is returned to a firm as a reduction in taxes, only 52 percent (1-.48) of the pre-tax cost of debt remains. For example, if "A" bonds pay 9.03 percent interest before tax, to determine a firm's true, after tax cost, one would multiply 9.03 by .52 to get a 4.7 percent debt cost.

Finding The Cost of Equity

Obtaining an exact cost of equity figure is difficult: financial theorists do not agree entirely on the best method of measuring it, and the effort to apply any measure to individual regulatees can very easily become a dark and deep quagmire if the issue is litigated. Consequently, the Department will use a very simple but well established approach.* This approach applies two simple rules of thumb:

- During periods of economic stability, investors expect an equity yield of from 2-4 percent above the cost of debt in order to compensate them for the added risk entailed in owning equity. Given the 9.03 percent example cost of debt, this would suggest a cost of equity in the range of 11.03 - 13.03 percent. For ease of calculation, we will use a simple rule: in periods when inflation is less than 6 percent per year, the cost of equity will be calculated as 3 percent above the then-current cost of debt.

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* See, e.g., Weston and Brigham's Managerial Finance.

* During periods of economic uncertainty, when pessimism is deep, interest rates high, and financial markets unstable, investors typically expect a 15 percent rate of return. For ease of calculation (and to err, if at all, on the conservative side) we will use a simple rule: in periods of high economic instability (as now -- high inflation, low stock market) the cost of equity will be calculated as 14.5 percent.

Calculating A Weighted Cost of Capital

To arrive at a weighted cost of capital, it is necessary only to multiply the cost of equity and of debt by their respective percentages of the industry's (or regulatee's) capital structure. Thus:

$$\left(\text{Percentage of Debt}\right)\left(\text{Cost of Debt}\right)\left(\text{Percentage of Equity}\right)\left(\text{Cost of Equity}\right) = \text{COST OF CAPITAL}$$

In our example, this works out as follows:

$$(.30)\ (4.7) + (.70)\ (14.5) = 11.57\% = \text{COST OF CAPITAL}$$

The above calculations should be repeated for each industry listed in the cost of capital table. A sample worksheet, including the example carried through in the above sections follows. Similar worksheets should be used for each calculation.

WORKSHEET FOR CALCULATING
AN INDUSTRY WIDE COST OF CAPITAL

INDUSTRY: Stone, Clay & Glass Products

SIC Code: 32

		Percent of Total Capitalization
DEBT:*	4833	30
EQUITY:*	11064	70
TOTAL:	15897	100

COST OF DEBT: 9.08% X .52 = 4.72%

COST OF EQUITY: 14.5%

COST OF CAPITAL: (%Debt) x (Cost of Debt) + (%Equity) X (Cost of Equity)

.30 x 4.7% + .70 x 14.5%

COST OF CAPITAL = 11.57%

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* Source: Federal Trade Commission: Quarterly Financial Report.

V-94

State of Connecticut
Thomas J. Meskill
Governor

QUI TRANSTULIT SUSTINET

CONNECTICUT MANUFACTURING DIRECTORY 1973

Connecticut Labor Department
200 Folly Brook Boulevard
Wethersfield, Connecticut 06109

JACK A. FUSARI
Labor Commissioner

THOMAS J. HAGUE
Deputy Commissioner

Five Dollars Per Copy

SAMPLE ENTRIES FROM THE CONNECTICUT MANUFACTURING DIRECTORY:

159

(a) Tiny Features, Inc.
637 Farmington Ave., Hartford 06105
Children's tabloid 27
(a) Tipping Industries, Inc.
75 Schoolground Rd., Branford 06405
Water purifiers 35
(a) Titan Tool Co.
113 Jetland St., Bridgeport 06605
Plastic mold dies 35
(a) Titan Tool & Die Co., Inc.
3 Marshall St., Wallingford 06492
Tools; dies; gages; stampings 35
(a) To-Le Machine Shop
362 New Haven Ave., Milford 06460
Machine shop 35
(a) Tober, A. W., Co.
25 No. Parade St., Stratford 06497
Commercial printing 27
(c) Todd-C. E. A., Inc.
Subsidiary of Combustion Equipment Associates
61 Taylor Reed Pl., Stamford 06902
Pollution control systems 34
(a) Tolland Fabrics, Inc.
8 School St., Stafford Springs 06076
Upholstery, drapery fabrics 22
(a) Tolland Machine Co.
Rt. 30, Rockville 06066
Machine shop 35
(b) Tollman Spring Co., Inc.
Ronzo Rd., Bristol 06010
Springs; wire forms 34
(b) Tomasso, Angelo, Inc.
Warren St., New Britain 06052
Rt. 6, Farmington 06032
South St., Portland 06480
Bituminous concrete 29
(b) Tomasso of North Haven, Inc.
Sackett Rd., No. Haven 06473
Asphalt paving materials 29
(b) Tomco Mfg. Co.
46 Manila Ave., Hamden 06514
Milling; tapping; drilling 35
(a) Tomlin Woodworking Co., Inc.
Rt. 6, Andover 06232
Cabinets, planing rough lumber 24
(b) Tomlinson, W. F., Co.
336 Main St., Danbury 06810
Concrete burial vaults 32
(a) Tommy's Welding Service
236 Hope St., Glenbrook 06906
Welding shop 35
(a) Tompson-Malone, Inc.
999 Sherman Ave., Hamden 06514
Publishing books 27
(a) Tom's Ornamental Iron Works
Rt. 7, Brookfield 06804
Iron railings 34
(a) Toni Mfg. Co., Inc.
153 East St., New Haven 06513
Ladies' swimwear 23
(a) Toni & Sons Ravioli Mfg. Co., Inc.
55 Spring St., New Haven 06519
Spaghetti products 20
(a) Toni's Bakery
439 Wolcott Rd., Wolcott 06716
Bakery products 20
(a) Tool Research, Inc.
1261 Stratford Ave., Stratford 06497
Tools 33

(b) Toolcraft Engineering, Inc.
3812 E. Main St., Waterbury 06705
Tools; dies 35
(a) Toolcraft, Inc.
18 Liberty St., Stamford 06902
Dies; jigs; precision parts 35
(a) Tooling Technology, Inc.
464 Pratt St., Meriden 06050
Jigs; fixtures 35
(a) Toolmakers, Inc.
15 Larsen St., So. Norwalk 06854
Machine shop 35
(a) Tools & Components, Inc.
Old New Hartford Rd., Barkhamsted 06098
Tools; dies; jigs; fixtures 35
(b) Topaz Handbags Ltd.
73 Daggett St., New Haven 06519
Leather handbags 31
(b) Tops Photo Engraving Corp.
1 Division St., Derby 06418
Photoengravings 27
(a) Topskill Mfg. Co., Inc.
32 John St., E. Hartford 06108
Machine shop 35
(a) Topstone Industries, Inc.
2 Augusta Dr., Danbury 06810
Children's toy make-up kits 39
(b) Topstone Rubber Toys Co., Inc.
2 Augusta Dr., Danbury 06810
Rubber, plastic masks; rubber squeeze toys 30
(a) Torin Corp.
Air Moving Div.
Still River Plant
Winsted Rd., Torrington 06790
Blower wheels; industrial blowers; fans 35
Machine Div.
Kennedy Dr., Torrington 06790
Wire-forming machinery 35
B. & B. Plastics Div.
100 Franklin Ave., Torrington 06790
Plastic electrical switch buttons 30
(a) Torino Baking Co.
43 Centennial Ave., Meriden 06450
Bakery products 20
(a) Toroid-Trans Electronics Co., Inc.
Lake Ave. Exit, Danbury 06810
Coil winding; electrical assemblies;
bobbins 36
(a) Toroidal Specialties, Inc.
87 Dodgingtown Rd., Bethel 06801
Toroidal coil winding 36
(a) Torrey Bros. Co.
Central Village, Plainfield 06374
Wooden mixing paddles, stable forks 24
(a) Torrington Brush Works, Inc.
63 Avenue A, Torrington 06790
Industrial brushes 39
(b) Torrington Casting Co., Inc.
293 New Litchfield St., Torrington 06790
Plumbing, electrical castings 34
(a) Torrington Chemical & Supply Co.
Rt. 116 & Hill Rd., Harwinton 06790
Industrial detergents 28
(f) Torrington Co.
Standard Plant
59 Field St., Torrington 06790
Needle bearings; cycle spokes, nipp[illegible]
pedals, handle bars; specialty metal
wire products 35

MAJOR INDUSTRY CLASSIFICATIONS USED IN DIRECTORY

Based on the 1967 Standard Industrial Classification Manual

MANUFACTURING INDUSTRIES IN SECTION II OF DIRECTORY

MAJOR INDUSTRY 19—ORDNANCE
Establishments engaged in manufacturing artillery, small arms and related equipment; ammunition; tanks and specialized tank parts; sighting and fire control equipment, and miscellaneous ordnance and accessories.

MAJOR INDUSTRY 20—FOOD
Manufacturing foods and beverages for human consumption and related products, such as manufactured ice, vegetable and animal fats and oils, and prepared feeds for animals and fowls.

MAJOR INDUSTRY 21—TOBACCO
This major group includes firms engaged in manufacturing cigarettes, cigars and stemming and redrying tobacco.

MAJOR INDUSTRY 22—TEXTILES
Establishments engaged in any of the following operations: (1) preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine and cordage; (2) broad woven fabric, narrow woven fabric, knit fabric and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric and knit apparel; (4) coating, waterproofing or otherwise treating fabrics; (5) the integrated manufacture of knit apparel and other finished articles from yarn, and (6) felt and lace goods, bonded-fiber fabrics and miscellaneous textiles.

MAJOR INDUSTRY 23—APPAREL
Manufacturers of clothing and fabricating products by cutting and sewing purchased woven or knit textile fabrics and related materials such as leather, rubberized fabrics, plastics and furs. Also included are (1) the "regular" or inside factories; (2) contract factories, and (3) apparel jobbers. Regular factories perform all of the usual manufacturing functions in their own plant; contract factories manufacture apparel from materials owned by others and apparel jobbers perform such functions as buying raw materials, designing and preparing samples, arranging for the manufacture of garments from their materials and selling the finished apparel.

MAJOR INDUSTRY 24—LUMBER AND WOOD
This group includes logging camps engaged in cutting timber and pulpwood, merchant sawmills, lath, shingle, cooperage stock, planing and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made of wood or wood substitutes.

MAJOR INDUSTRY 25—FURNITURE AND FIXTURES
Manufacturers of household, office, public building and restaurant furniture, and office and store fixtures.

MAJOR INDUSTRY 26—PAPER
The manufacture of pulps from wood and other cellulose fibers and rags; paper and paperboard, and the manufacture of paper and paperboard into converted products such as paper coated off the paper machine, paper bags, boxes and envelopes.

MAJOR INDUSTRY 27—PRINTING AND PUBLISHING
Establishments engaged in printing by one or more of the common processes, such as letterpress, lithography, gravure, or screen; firms performing services for the printing trade such as bookbinding, typesetting, engraving, photoengraving and electrotyping and establishments engaged in publishing newspapers, books and periodicals, regardless of whether or not they do their own printing.

MAJOR INDUSTRY 28—CHEMICALS
This major group includes establishments producing basic chemicals and others manufacturing products by predominantly chemical processes. Products manufactured by these firms are in three general classes: (1) basic chemicals such as acids, alkalies, salts and organic chemicals; (2) chemical products to be used in further manufacture such as synthetic fibers, plastic materials, dry colors and pigments, and (3) finished chemical products to be used for ultimate consumption such as drugs, cosmetics and soaps or to be used as materials or supplies in other industries such as paints, fertilizers and explosives.

MAJOR GROUP 29—PRODUCTS OF PETROLEUM AND COAL
This major group includes establishments primarily engaged in manufacturing paving and roofing materials and compounding lubricating oils and greases from purchased materials.

MAJOR INDUSTRY 30—RUBBER AND PLASTICS

Manufacturing from natural, synthetic or reclaimed rubber products such as tires, rubber footwear, mechanical rubber goods, heels and soles, flooring and rubber sundries. This group also includes establishments manufacturing tires. Automobile tire repair shops engaged in recapping and retreading automobile tires are classified in Section III, Auto Repair Shops. This group also includes establishments engaged in molding primary plastics for the trade and manufacturing miscellaneous finished plastic products.

MAJOR INDUSTRY 31—LEATHER

Tanning, currying and finishing hides and skins and establishments manufacturing finished leather and artificial leather products and similar products made of other materials. Leather convertors are also included.

MAJOR INDUSTRY 32—STONE, CLAY, GLASS AND CONCRETE PRODUCTS

This major group includes establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, etc., from materials taken principally from the earth in the form of stone, clay and sand.

MAJOR INDUSTRY 33—PRIMARY METAL INDUSTRIES

Smelting and refining of ferrous and nonferrous metals from ore, pig or scrap; rolling, drawing and alloying of ferrous and nonferrous metals; castings, forgings and other basic products of ferrous and nonferrous metals and the manufacture of nails, spikes and insulated wire and cable. This major group also includes the production of coke.

MAJOR INDUSTRY 34—FABRICATED METAL PRODUCTS

Fabricating ferrous and nonferrous metal products such as metal cans, tinware, hand tools, cutlery, general hardware, non-electric heating apparatus, fabricated structural metal products, metal stampings and a variety of metal and wire products not classified elsewhere.

MAJOR INDUSTRY 35—MACHINERY

Establishments engaged in manufacturing machinery and equipment other than electrical equipment (Major Industry 36) and transportation equipment (Major Industry 37). Machines powered by built-in or detachable motors ordinarily are included in this major group, with the exception of electrical household appliances (Major Industry 36). Portable tools, both electric and pneumatic powered, are included in this major group but hand tools are classified in Major Industry 34.

MAJOR INDUSTRY 36—ELECTRICAL EQUIPMENT

This major group includes establishments engaged in manufacturing machinery, apparatus and supplies for the generation, storage, transmission, transformation and utilization of electrical energy. The manufacture of household appliances is included in this group, but industrial machinery and equipment powered by built-in or detachable electric motors are classified in Major Industry 35.

MAJOR INDUSTRY 37—TRANSPORTATION EQUIPMENT

Manufacturing of equipment for transportation of passengers and cargo by land, air and water. Products include motor vehicles, aircraft, ships, boats, railroad equipment and miscellaneous transportation equipment such as motorcycles, bicycles, trailers and mobile homes.

MAJOR INDUSTRY 38—PROFESSIONAL, SCIENTIFIC AND CONTROLLING INSTRUMENTS; PHOTOGRAPHIC AND OPTICAL GOODS; WATCHES AND CLOCKS

Establishments engaged in manufacturing mechanical measuring, engineering, laboratory and scientific research instruments; optical instruments and lenses; surgical, medical and dental instruments, equipment and supplies; ophthalmic goods; photographic equipment and supplies; and watches and clocks.

MAJOR INDUSTRY 39—MISCELLANEOUS MANUFACTURING INDUSTRIES

This major group includes establishments primarily engaged in manufacturing products not classified in any other manufacturing group. Industries in this group fall into the following categories: jewelry, silverware and plated ware, musical instruments; toys, sporting and athletic goods; pens, pencils and other office and artists' materials; buttons, costume novelties, miscellaneous notions, brooms and brushes; morticians' goods and other miscellaneous manufacturing industries.

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Quarterly Financial Report

for manufacturing corporations

SECOND QUARTER
1974

FEDERAL TRADE COMMISSION

ESIC INDEX TO FINANCIAL STATISTICS BY INDUSTRY

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[1] Each lettered table includes, in successive order, an income statement, balance sheet and ratio formatted balance sheet.

TABLE D-2 BALANCE SHEET FOR

SIC INDUSTRIES

(Million

	Stone, Clay and Glass Products		
	4Q 1973	1Q 1974	2Q 1974
ASSETS			
Cash and demand deposits in the U.S.	642	424	396
Time deposits in the U.S., including negotiable certificates of deposit	217	236	197
Deposits outside the U.S.	3	3	9
Cash on hand and in banks	862	683	602
U. S. Treasury securities (i) Subject to agreements to sell	12	0	2
U. S. Treasury securities (ii) Other, due in 1 year or less	44	45	36
U. S. Treasury securities (iii) Other, due in more than 1 year	12	9	4
Federal agency securities (i) Subject to agreements to sell	0	1	0
Federal agency securities (ii) Other, due in 1 year or less	17	7	2
Federal agency securities (iii) Other, due in more than 1 year	1	0	4
Commercial and finance company paper of U.S. issuers	237	122	69
State and local government securities due in 1 year or less	44	39	33
Foreign securities due in 1 year or less	7	8	2
Other short-term financial investments including bankers' acceptances	38	31	20
Total cash, U.S. Government and other securities	1,275	965	775
Trade receivables from U.S. Government	4	9	35
Other trade accounts and trade notes receivable (less allowances for doubtful receivables)	3,248	3,433	3,730
Total receivables	3,252	3,442	3,765
Inventories	2,930	3,302	3,510
Current assets not elsewhere specified	540	594	523
Total current assets	8,017	8,302	8,572
Depreciable/and amortizable fixed assets, including construction in progress	16,640	16,974	16,924
Land and mineral rights	738	805	879
Deduct: Accumulated depreciation, depletion, and amortization	8,422	8,543	8,531
Net property, plant, and equipment	8,956	9,236	9,273
Non-current assets not elsewhere specified, including investment in non-consolidated entities, other long-term investments, intangibles, etc.	2,127	2,189	2,181
Total assets	19,101	19,727	20,026
LIABILITIES AND STOCKHOLDERS' EQUITY			
Short-term loans (original maturity of 1 year or less) a. Loans from banks	469	542	686
Short-term loans (original maturity of 1 year or less) b. Commercial paper	197	153	181
Short-term loans (original maturity of 1 year or less) c. Other short-term loans	39	52	58
Advances and prepayments by U.S. Government	0	0	1
Trade accounts and trade notes payable	1,314	1,281	1,402
Income taxes accrued, prior and current years, net of payments a. Federal	311	328	277
Income taxes accrued, prior and current years, net of payments b. Other	43	31	45
Installments, due in 1 year or less, on long-term debt a. Loans from banks	182	149	164
Installments, due in 1 year or less, on long-term debt b. Other long-term debt	227	214	274
Current liabilities not elsewhere specified, including excise and sales taxes, and accrued expenses	916	1,038	1,122
Total current liabilities	3,681	3,829	4,190
Long-term debt due in more than 1 year a. Loans from banks	816	932	913
Long-term debt due in more than 1 year b. Other long-term debt	2,763	2,931	3,040
Non-current liabilities not elsewhere specified, including deferred income taxes	842	915	916
Minority stockholders' interest in consolidated domestic corporations	44	35	34
Total liabilities	8,148	8,663	9,094
Capital stock and other capital	3,362	3,441	3,419
Retained earnings	7,863	7,902	7,806
Deduct: Treasury stock, at cost	272	279	292
Stockholders' equity	10,953	11,064	10,932
Total liabilities and stockholders' equity	19,101	19,727	20,026
NET WORKING CAPITAL			
Excess of current assets over current liabilities	4,336	4,473	4,382

1/ Included in Primary Metal Industries.

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Financial DYNAMICS

—INDUSTRIALS—

ANNUAL FINANCIAL ANALYSIS

BUILDING MTRLS-CEMENT
AMCORD INC

[illegible]

LANCE SHEET	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
	TOTAL DOLLARS -000,000-									
56 Cash & Equivalent	7	5	8	7	4	7	8	8	8	2
57 Compensating Balances	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
58 Receivables	9	7	13	16	24	21	20	20	18	16
59 Inventories	10	9	13	22	28	27	29	29	31	51
60 Other Current Assets	1	1	1	5	5	5	6	4	3	3
61 Total Current Assets	26	23	34	50	61	60	63	61	60	72
62 Investments & Advances	4	5	12	20	34	34	23	22	18	12
63 Other Assets	5	4	4	6	11	4	5	3	2	2
64 Net Plant	86	82	81	118	110	115	126	118	119	127
65 Intangibles	0	2	0	-2	2	2	2	1	1	6
66 Total Assets (Liabilities & Net Worth)	120	117	132	202	217	215	218	205	199	219
67 Current Liabilities	18	15	21	35	54	48	50	43	43	53
68 Other Liabilities	1	1	1	2	2	3	2	2	2	2
69 Long-Term Debt	22	22	20	66	72	75	76	71	65	70
70 Minority Interest	0	2	0	1	1	1	3	0	0	0
71 Preferred Stock	11	10	20	20	20	19	19	19	18	18
72 Deferred Taxes & Investment Credit	8	8	10	11	8	8	8	8	8	9
73 Common Equity (Book Value)	60	61	59	66	60	61	61	62	63	67
74 Total Invested Capital	101	101	109	165	160	165	166	160	154	164
75 Working Capital	8	8	13	15	6	12	12	18	17	19
76 Current Ratio	1.4	1.6	1.6	1.4	1.1	1.2	1.2	1.4	1.4	1.4
ESTED CAPITAL	AS % OF TOTAL INVESTED CAPITAL									
77 Long-Term Debt	22	22	19	40	45	46	46	45	42	43
78 Minority Interest	0	0	0	1	1	1	2	0	0	0
79 Preferred Stock	10	10	19	12	12	12	11	12	12	11
80 Deferred Taxes & Investment Credit	8	8	9	7	5	5	5	5	5	5
81 Common Equity (Book Value)	59	60	54	40	37	37	37	39	41	41
KET DATA	PER SHARE DATA									
82 Price-High	12	12	16	24	20	13	10	9	7	5
83 Price-Low	10	8	8	13	9	6	5	6	4	3
84 Price-Close	10	8	16	19	10	7	6	6	4	3
85 Earns P S Prim (Excl Ex It Dis Opi)	1.04	0.80	1.20	1.16	0.55	0.55	0.31	0.57	0.75	0.92
86 P-E Ratio Range	12- 9	15- 9	14- 6	21-11	35-17	24-11	31-17	15-11	9- 5	5- 3
87 Year-End Close P-E	10	10	14	16	18	13	21	11	6	3
88 High P-E as % Low P-E Ratio	127	160	219	185	210	221	181	144	160	190
89 Cash Flow Per Share	2.40	2.34	2.50	2.52	0.54	1.69	1.54	1.83	1.97	1.99
90 Price-Cash Flow Ratio Range	5- 4	5- 3	6- 3	10- 5	36-17	8- 4	6- 3	5- 3	3- 2	3- 1
91 Year-End Close Price-Cash Flow	4	3	6	7	18	4	4	3	2	2
92 Dividends Per Share Paid	0.53	0.55	0.55	0.55	0.55	0.20	0.00	0.00	0.20	0.23
93 Dividends as % Available for Common	51%	70%	40%	46%	98%	50%	0%	0%	0%	24%
94 Dividends as % Cash Flow	22%	24%	19%	21%	101%	15%	0%	0%	0%	10%
5 Dividend Yield-High	5.7	7.4	7.4	4.2	5.9	0.0	0.0	0.0	5.2	9.1
6 Dividend Yield-Low	4.5	4.6	3.4	2.3	2.8	0.0	0.0	0.0	3.1	4.8
7 Dividend Yield-Close	5.3	7.3	3.4	2.9	5.7	0.0	0.0	0.0	4.7	8.0
INDUSTRY RELATIVES	AS % OF S&P INDEXES									
8 Year-End Close Price	34	36	55	41	29	19	16	18	18	NA
9 Earns P S Primary (Ex Ex It/Dis Opi)	39	40	68	49	21	34	12	19	19	NA
0 P-E Ratio-High	77	96	73	102	207	102	169	108	98	NA
1 P-E Ratio-Low	87	91	52	97	137	66	131	95	95	NA
2 Year-End Close P-E Ratio	87	90	82	84	142	57	134	95	91	NA
3 % Return on Avg Common Equity	122	111	220	171	77	127	43	68	70	NA
4 Year-End Close Yield	100	111	74	97	144	0	0	0	81	NA
425 RELATIVES										
5 Year-End Close Price	11	9	16	17	10	7	6	5	4	4
6 Earns P S Primary (Ex Ex It Dis Opi)	19	14	21	19	9	10	5	8	8	NA
7 P-E Ratio High	66	88	72	108	107	125	161	79	56	NA
8 P-E Ratio Low	60	72	43	74	130	79	105	65	65	NA
9 Year-End Close P-E Ratio	56	66	74	89	106	71	111	55	46	NA
0 % Return on Avg Common Equity	63	44	84	85	46	54	27	46	48	NA
1 Year-End Close Yield	153	107	108	96	165	0	0	0	130	153

STATEMENT OF FIN COND—	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
	TOTAL DOLLARS -000,000-									
112 Net Inc (Incl Ex It/Dis Opi)	5.0	4.2	6.9	7.4	-4.0	4.3	2.8	4.6	5.4	6.3
113 Depreciation & Amort	6.8	6.7	7.0	7.8	8.1	8.0	7.4	7.5	7.2	7.4
114 Deferred Income Taxes	1.0	0.8	1.4	2.4	-7.4	NA	NA	NA	NA	-0.7
115 Chg in LTD & Pfd	-2.0	-0.8	8.7	45.3	5.7	2.8	0.0	-4.8	-7.3	5.4
116 Chg in Common Stock	NA	NA	NA	NA	NA	NA	NA	NA	-2.2	0.2
117 Sale of Prop, Plant & Equip	NA	NA	NA	NA	NA	NA	NA	NA	1.0	2.4
118 Pfd Dividends	0.7	0.6	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.0
119 Common Dividends	2.6	2.4	2.4	3.1	3.3	1.7	0.0	0.0	0.0	1.3
120 Capital Expenditures	5.4	3.3	3.3	7.0	3.2	30.3	14.1	11.8	8.9	17.5
121 Chg in Investments	NA	NA	NA	NA	NA	NA	NA	NA	-1.4	-6.5
122 Chg in Working Capital	-0.2	0.7	5.1	1.5	-8.6	5.7	0.5	5.7	-1.5	2.5
123 Total Sources & Uses	NA	NA	NA	NA	NA	NA	NA	NA	21.8	37.4
DEBT ANALYSIS—										
124 Notes Payable	NA	NA	NA	NA	NA	16.3	22.5	12.5	8.5	10.6
125 Current Portion LTD	NA	NA	NA	NA	NA	7.3	5.4	7.3	6.4	8.2
126 LTD	22.4	21.9	20.5	66.1	72.1	75.2	75.8	71.3	64.6	70.3
127 Pres Value Lease Oblig	NA	NA	NA	NA	NA	NA	NA	NA	NM	NA
128 Unfd Pens Lia-Vest Ben	NA	NA	NA	NA	NA	NA	NA	NA	5.0	7.0
129 Unfd Pens Lia-PSC	NA	NA	NA	NA	NA	NA	NA	NA	10.0	9.7
130 Total Adjusted Debt	22.4	21.9	22.5	66.1	72.1	98.8	103.8	91.1	84.5	96.6
131 % LTD Tied to Prime	NA	NA	NA	NA	NA	NA	NA	NA	23.2	22.6
132 LTD Maturing-5 Years	NA	NA	NA	NA	NA	NA	NA	NA	35.1	43.4
133 STD as % LTD & STD	5.9	6.0	10.7	13.4	26.3	23.9	26.9	21.7	18.8	21.3
134 Interest Coverage	6.6	5.3	8.8	6.4	2.5	2.3	2.2	2.4	2.5	1.9
135 Total Fixed Chg Coverage	4.0	3.2	4.7	4.1	1.9	1.8	1.5	1.8	1.9	1.7
ASSETS—										
136 Y-E Gross Assets ($ Mil)	184	185	207	282	305	311	319	303	299	319
137 Y-E Gr Opr Assets ($ Mil)	174	173	190	246	255	267	281	274	276	302
138 P/T Ret-Avg Gr Opr Assets	4.1%	3.1%	5.3%	5.3%	2.4%	2.8%	1.8%	3.5%	4.3%	5.3%
139 P/T Ret-Avg Gr Assets	4.7%	3.4%	5.7%	5.6%	3.2%	3.6%	2.7%	4.1%	4.8%	5.6%
140 A/T Ret-Avg Gr Assets	3.2%	2.2%	3.5%	3.0%	1.4%	1.4%	0.9%	1.4%	1.8%	2.0%
INVESTED CAPITAL—										
141 Y-E Invested Capital P/S	23.03	23.09	21.44	28.29	26.53	27.26	27.49	26.27	27.10	28.80
142 Sales Per $ Avg Inv Cap	0.66	0.67	1.00	0.93	0.84	0.82	0.80	0.91	1.02	1.12
143 P/T Ret on Avg Inv Cap	8.1%	6.2%	10.6%	10.0%	5.7%	6.8%	5.1%	7.8%	9.2%	10.9%
144 A/T Ret on Avg Inv Cap	6.6%	5.0%	7.4%	6.4%	4.5%	4.7%	3.2%	4.7%	5.8%	6.2%
COMMON EQUITY—										
145 Y-E Common Eqty P/S	13.66	13.93	11.51	11.37	9.87	10.15	10.13	10.25	11.10	11.84
146 P/T Ret-Avg Com Eqty	10.2%	7.1%	14.7%	16.7%	6.8%	8.2%	4.7%	9.2%	11.1%	10.8%
147 A/T Ret-Avg Com Eqty	8.3%	5.8%	10.2%	10.7%	5.3%	5.6%	3.0%	5.5%	7.0%	8.2%
148 Prc to Com Eqty P/S-High	90.6%	86.3%	143%	212%	199%	131%	94.7%	85.6%	58.3%	42.2%
149 Prc to Com Eqty P/S-Low	71.1%	53.9%	65.3%	116%	96.0%	59.2%	52.2%	58.5%	34.7%	22.2%
150 Intern Grth Rate Avg C E	4.1%	1.0%	6.1%	5.7%	-13%	2.8%	3.0%	5.7%	7.0%	6.2%
GROSS PLANT—										
151 Y-E Gr Plant ($ Mil)	149	150	157	199	198	211	222	215	218	227
152 Net Plant as % Gr Plant	57.5%	54.8%	51.8%	59.5%	55.5%	54.6%	56.6%	54.7%	54.4%	55.9%
153 Sales Per $ Avg Gr Plant	0.45	0.45	0.68	0.71	0.69	0.65	0.61	0.68	0.74	0.80
154 Depr Amort as % Avg Gr Pl	4.6%	4.5%	4.6%	4.4%	4.1%	3.9%	3.4%	3.4%	3.3%	3.3%
155 Cap Expend as % Avg Gr Pl	3.7%	2.2%	2.2%	3.9%	1.6%	14.8%	6.5%	5.4%	4.1%	7.9%
SALES—										
156 Sales Per $ Avg Receivables	8.80	8.39	10.19	8.85	6.95	6.01	6.42	7.37	8.34	10.35
157 Sales Per $ Avg Inventory	6.98	7.14	9.52	7.23	5.44	4.90	4.74	5.12	5.34	4.30
158 Sales Per $ Avg Work Cap	8.57	8.49	9.65	8.96	12.97	14.92	10.93	9.81	9.28	10.05
159 Incr $ Sales Per Incr $ WC	NM	2.14	7.27	15.07	NM	-0.45	-4.10	2.96	NM	7.29
MARKETABILITY—										
160 Mkt Val Shrs O/S ($ Mil)	48	33	84	110	59	44	30	37	24	17
161 Mkt Val Shrs Trd ($ Mil)	7	3	26	51	21	12	10	8	3	2
162 Shrs Trd as % Shrs O/S	16.0	10.1	31.5	46.2	35.7	26.4	26.6	21.8	12.9	10.2
163 No of Shrs O/S (Mil)	4.4	4.4	5.1	5.8	6.0	6.0	6.0	6.1	5.7	5.7
164 Shrs Used in Calc EPS (Mil)	4.9	4.4	5.1	5.8	6.0	6.7	6.0	6.0	5.9	6.4

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MOODY'S INVESTORS SERVICE, INC.
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SEE FOLLOWING PAGE FOR COMPLETE LIST OF OFFICES

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Plants and Properties: Company and subsidiaries operate a total of 41 plants having combined floor space of about 3,000,000 square feet. Plants are located Meriden, Wallingford, Bridgeport, Conn., Chicago, Ill., Phoenix, Ariz., Birmingham, Ala., Royal Oak, Mich., Tipton, Butler, Muncie, Lafayette, Ind., Conshohocken, Wilkes-Barre, Pa., Mayesville, Robbinsville, N. C., Yonkers, Port Washington, Mt. Vernon, Buffalo, N. Y., Dallas, San Angelo, El Paso, Texas, Covina, Canoga Park, Los Angeles, Calif., Hollywood, Fla., Paterson, N. J., Louisville, Ky., St. Louis, Mo., Old Hickory, Tenn., Minneapolis, Minn., Barrie, Ontario, Holyoke, Mass.; Chatham, Va., and Taiwan.

Company also operates 29 retail stores for distribution of its coating and chemical products in major cities in Iowa, Wisconsin, Missouri, California and Hawaii.

Subsidiaries

Times Wire & Cable Co. (wholly-owned) manufactures coaxial cable for community antenna television and engineered wire and cable and connectors for specialized electronic applications. Plants located in Wallingford, Conn. and Phoenix, Ariz.

W. H. Hutchinson & Son, Inc. (wholly-owned) Principal product is bottle caps. Also does commercial decorating for manufacturers of various types of containers, toys and other lithographed items. Plants at Chicago, Ill. and Birmingham, Ala.

MRM Industries (wholly owned) producer of semi-fabricated and finished nonferrous mill products. Massasoit Trading Company (wholly owned by MRM Industries) manufactures components used in the process of upholstering furniture.

Steel Parts Corp. (wholly-owned) Manufactures bushings, door hinges, clutch plates for automotive industry. Plant at Tipton, Ind.

Peerless Wire Goods Co., Inc., Lafayette, Ind. (wholly owned) manufactures wire-coated racks for dish washers, etc.

Hawthorne Metal Products Co. (wholly-owned) manufactures large metal stampings for automotive industry. Plant located at Royal Oak, Mich.

Taylor Publishing Co. (wholly-owned) world's largest manufacturer of high school and college yearbooks. Plants at Dallas and San Angelo, Tex., Covina, Cal., El Paso, Tex. and Juarez, Mexico.

International Graphics, Inc. (wholly-owned by Taylor Publishing) prints postcards, brochures, financial publications. Plant in Hollywood, Fla.

Roth Greeting Cards, Inc. (wholly-owned by Taylor Publishing) produces greeting cards and personalized stationary. Plant in Canoga Park, Cal.

Stewart Stamping Corp. (wholly-owned) Manufactures stamped metal and wire-formed products for electronic and electrical industries. Plant at Yonkers, N. Y.

American Components Inc. (wholly-owned) Manufactures thin film resistors and chip capacitators. Plants at Conshohocken, Pa. and Mayesville, N. C.

World Tableware Corp. (wholly-owned). Owns controlling interest in International Tableware Industrial Corp. (Taiwan sub.) which manufactures stainless steel flatware in Taiwan.

Enterprise Paint Mfg. Co. (Div. of Insilco Corp.) makes paints, varnishes and related products for consumer use. Also hobby-crafts and industrial maintenance and cleaning chemicals. Plants in Chicago and Wheeling, Ill.

Sinclair Paint Co. (Div. of Insilco Corp.) manufactures paint and also sells wall coverings. Plant in Los Angeles, Calif.

Red Devil Paints, Inc. (Div. of Insilco Corp.) manufactures paint. Plant in Mt. Vernon, N. Y.

McDonald Products Corp. (wholly owned) manufactures office and desk top accessories. Plant in Buffalo, N. Y.

Fruch A. Co. (Div. of Insilco Corp.) manufactures paints. Plant is in Paterson, N. J.

Zephyr-American Corp. (wholly-owned) makes desking rotary card files, index systems and other office devices. Plant located in Moca, P. R.

Miles Homes Co. provides an individual with the plans, materials and guidance to build his own home. Plants located in Minneapolis, Minn.; Wilkes-Barre, Pa. and Butler, Ind.

Tobey Color Cards Co. engaged in distribution of color cards, color books, and fabric carpet.

Connoisseur Studios Inc. manufactures hobby crafts in plant located in Louisville, Ky.

A & R Tool Co. manufactures tools in plant in Old Hickory, Tenn.

Joint Venture: In Nov. 1972 Times Wire and Cable Co., subsidiary completed negotiations with a Belgian wire and cable producer, LaSenelfaise S.A., to form a joint venture organization to manufacture and distribute CATV cable in Belgium and other countries of the European Common Market called LaSenelfaise-Times S.A. Ownership is divided equally between Times and LaSenelfaise. Co. has 20,000-sq. ft. plant in Seneffe, South of Brussels.

Officers:

D. B. Blatz, Pres. and Chief Exec. Officer

J. B. Stevens, Exec. Vice-President

L. J. DeGeorge, Exec. Vice-President

J. D. Shaw, Vice-President

J. W. Taylor, Jr., Vice-President

H. E. Bartels, Vice-President

M. Q. Fiterman, Vice-President

W. M. Lynch, Vice-President

H. W. Byrune, Vice-Pres. & Gen. Cnsl. & Sec.

D. J. Harper, Vice-President

A. R. Wolff, Vice-President

R. E. Pursley, Vice-Pres.

W. E. Baer, Controller

G. E. Peterson, Jr., Vice-Pres. (Fin.)

W. J. Amberg, Treas.

Directors:

J. W. Field, Fairfield, Conn.

J. D. Shaw, Meriden, Conn.

J. B. Stevens, Wallingford, Conn.

D. E. Noble, Wooster, Ohio

C. C. Davis, New York

M. Q. Fiterman, Minneapolis, Minn.

D. B. Blatz, Wallingford, Conn.

F. J. Manheim, New York, N. Y.

J. A. Tomlinson, Danbury, Conn.

J. W. Taylor, Jr., Dallas, Tex.

C. E. Lord, Hartford, Conn.

L. J. DeGeorge, Cheshire, Conn.

W. G. Dillon, New York

J. W. Taylor

A. R. Wolff, Winnetka, Ill.

Auditors: Price Waterhouse & Co.

Annual Meeting: Last Wednesday in April.

No. of Stockholders: Feb. 22, 1974: Series A preferred, 1,345; 5% preferred, 328; common, 16,932.

No. of Employees: Dec. 31, 1973, 9,572.

Main Office: 1300 Research Pkway., Meriden, Conn. 06450.

Consolidated Income Account, years ended Dec. 31 ($000 omitted):

	1973	①1972	1971
Net sales	366,700	338,313	287,592
Other inc	4,936	3,008	1,030
Total	371,636	341,321	288,622
Cost of sales	243,576	227,503	190,403
Sell., etc., exp.	76,367	72,306	61,400
Deprec	8,013	7,632	7,396
Interest	11,439	7,970	7,283
⑦Inc. taxes	15,012	13,360	10,833
Extraord. chg.	......	②1,300	③360
Net income	14,979	12,044	10,668
Prev. ret. earn.	48,312	45,494	42,339
5% pfd. divs	75	75	75
2nd pfd. divs	948	948	948
Com. divs. (cash)	6,299	6,410	6,273
Pfd. stk. retired	......	9	......
Pool int. adj.	......	d784	d170
⑦Debit	......	⑦302	⑦700
Retain. earn.	①57,121	48,312	45,494
⑦Earn., com. sh.	$1.51	⑦$1.18	⑦$1.03
Yr. end shs.	9,907,327	9,339,780	9,339,780

①$24,226,000 not restricted. ②Chgs. relating to issuance of com. shs. in trees in "pool int." ③Reduced by $345,000 (1972, $300,000; 1971, $281,000) invest. tax credit. ⑤From U. S. dollar devaluation on Swiss franc loan. ⑥As reported on 9,848,000 (1972, 10,163,000; 1971, 9,394,000) aver. com. & com. equiv. sh. ⑦Incl. Miles Homes Companies, from June 1, 1972, date of acq. ⑦$1.31 in 1972 and $1.07 in 1971 before extraord. chg.

Note: Earn. com. sh. amounted to $1.37 in 1973, $1.11 ($1.22 bef. extraord. chg.) in 1972 & $1.01 ($1.03 bef. extraord. chg.) in 1971 assum. full dilution.

Consolidated Balance Sheet, as of Dec. 31 ($000 omitted):

	1973	①1972
Assets:		
Cash	8,386	11,763
Mkt. sec., cost	......	159
Receiv., net	98,413	89,386
②Inventories	92,216	90,966
Prepayments	2,664	3,344
Total current	202,079	205,638
③Net prop., etc.	71,646	70,874
Other assets	15,839	6,501
Intangibles	50,000	52,735
Def. chgs.	3,370	4,328
Total	343,196	340,136
Liabilities:		
Notes payable	31,387	47,884
Accts., etc., pay.	31,960	29,633
Customers dep.	7,077	6,232
Income taxes	16,276	17,673
Total current	106,690	100,992
Deb. 5½s, 1989	7,326	11,470
Deb. 5s, 1993	32,375	33,375
Notes pay	79,832	60,115
Def. inc. tax, etc.	13,200	11,478
5% pfd. stk. ($25)	937	939
④Conv. A pfd.	1,313	1,313
⑤Com. stk.	49,836	49,855
Retained earnings	57,121	48,312
Stockhold. equity	109,429	101,819
⑥Reacquired stk.	5,939	1,181
Net stkhld. eq.	103,490	100,638
Total	343,196	340,136
Net curr. assets	95,439	104,736
③Deprec.	52,006	54,397

②Lower of cost or mkt. ④317,371 (1972, 85,171) com. shs. at cost. ⑤$736,647 no par shs. (9,423,000 (1972, 9,424,961)) par $1 shs. △Reclassified for comparative purposes.

Long Term Debt Outstg. Dec. 31, 1973 (excluding current portion): $32,202,000 senior long term debt comprised of:

(1) $15,000,000 8¼% notes payable to an insurance company due $1,340,000 annually beginning 1975.

(2) $17,000,000 7½% Swiss franc loan due July 15, 1976. Loan may be prepaid at the option of Co. at 101.5% of principal amount from July 15, 1974 to July 14, 1975, and at 101 thereafter.

(3) $13,700,000 3¾% to 8½% miscellaneous debt due to 1998.

Insilco Overseas Capital Corporation N.V. Guaranteed Floating Rate Loan notes due 1980:

AUTH.—$25,000,000, outstg., Dec. 31, 1973, $5,-625,000.

DATED—July 31, 1970. DUE—July 31, 1980.

INTEREST—Fixed twice yearly at 1% above the six month London Eurodollar rate, with 7½% minimum, current rate is 10⅛% to July 31, 1974.

DENOMINATION—Bearer coupon from, $1,-000, $10,000, $100,000 and $,000,000.

SINKING FUND—Two annual payments of $2,500,000 each on July 31, 1971 and 1972 and seven annual payments of $1,000,000 on July 31, 1973 through 1979. The balance of $13,000,-000 will mature on July 31, 1980.

SECURITY—Not secured senior indebtedness, guaranteed by Insilco.

DIVIDEND RESTRICTION—Co. may not pay cash divs. on or acquire com. in excess of consolidated net income after Dec. 31, 1966 plus net proceeds from sale of stock or debt converted into stock after Dec. 31, 1967 plus $10,000,000.

Convertible Debt: 1. International Silver Co. convertible subordinated debenture 5s, due 1993:

Rating—Ba

AUTHORIZED—$35,175,000, outstanding, Dec. 31, 1973, $32,375,000.

DATED—Jan. 1, 1968. DUE—Jan. 1, 1993.

INTEREST—J&J1 to registered holders.

TRUSTEE—Irving Trust Co., NYC.

DENOMINATION—Fully registered, $100, $500, $1,000 and authorized multiples of $1,000 thereof.

CALLABLE—As a whole or in part on at least 30 days' notice to each Dec. 31, incl., as follows:

1974	103¼	1975	103	1976	102¾
1977	102½	1978	102¼	1979	102
1980	101¾	1981	101½	1982	101¼
1983	101	1984	100¾	1985	100½
1986	100¼	After	100		

Also callable for sinking fund (which see) at par.

SINKING FUND—Annually, to retire debs. at par each Jan. 1, 1979-92, cash (or debs.) equal to $1,730,000 debs. outstg. plus similar optional payments.

SECURITY—Not secured; subordinated to all senior debt.

CONVERTIBLE—Into com. at any time (if called, on or before 15th day prior to redemption date) at $33.33 a sh. No adjustment for interest or divs. Cash paid in lieu of fractional shs. Conversion privilege protected against dilution.

DIVIDEND RESTRICTION—Co. may not pay cash divs. on or acquire capital stock in excess of consolidated net income after Dec. 31, 1966 plus proceeds from sale of stock or debt converted into stock after such date plus $10,000,000.

ADDITIONAL DEBT—May be created if immediately thereafter, consolidated tangible assets less consolidated liabilities (less funded debt) is at least 200% of funded debt.

INDENTURE MODIFICATION—Indenture may be modified, except as provided, with consent of 66⅔% of debs. outstg.

LISTED—On New York Stock Exchange.

PURPOSE—Proceeds to retire debt and for general purposes.

OFFERED—See Debenture Subscription Rights below.

PRICE RANGE—	1973	1972	1971	1970	1969
High	74½	92	95½	84½	110
Low	53	80½	73½	58½	76

Debenture Exchange Offer: In Apr. 1974 company offered to exchange $550 principal amount of 9½% Ba rated convertible subord. debs. due Apr. 1, 1999 for each $1,000 principal amount of 5s, due 1993. New debs. conv. into common at $33.33 per sh. Offer expires May 21, 1974.

2. International Silver Co. convertible subordinated debenture 5½s, due 1989:

Rating—Ba

AUTH.—$20,207,000; outstg., Dec. 31, 1973, $11,-470,000.

DATED—Jan. 1, 1969. DUE—Jan. 1, 1989.

INTEREST—J&J1.

TRUSTEE—Schroder Trust Co., NYC.

DENOMINATION—Fully registered, $100, $500, $1,000 and authorized multiples of $1,000

Transfer Agent, Registrar and Dividend Disbursing Agent: Security Trust Co., Rochester, N. Y.

Recapitalization: On Sept. 30, 1948, each share of 7% $100 par preferred with arrears of $40.25 per share was exchanged for seven $20 par 5% preferred shares (since retired), and three $5 par common shares, and each $50 par common share was exchanged for ten $5 par common shares.

HOWARD JOHNSON CO.

History: Incorporated in Maryland Mar. 10, 1961, succeeding business established in 1925. In Mar. 1973, Co. acquired 4 Howard Johnson restaurants from Tower Grill of Pennsylvania Inc., for an undisclosed cash sum.

Business: Company operates and supplies chain of Howard Johnson's, Red Coach Grill, and Ground Round restaurants and also operates and licenses "Howard Johnson's Motor Lodges". In addition, company processes and distributes frozen and packaged foods. Also, company through Landmark Supply Division, sells motor lodge and restaurant equipment and furnishings. In 1964, formed Automatic Merchandising Division which markets its own and other companies products.

As of Dec. 29, 1973, chain included 891 Howard Johnson's restaurants (611 operated by company and 270 by licensees), 29 Red Coach Grill's restaurants (24 operated by company and 5 by licensees), 38 Ground Round restaurants, and 493 Howard Johnson's Motor Lodges (119 operated by company and 374 by licensees), in 40 states, Bahamas, Puerto Rico, B. W. I., Dist. of Col., and Canada.

Property: Co. operates 9 manufacturing and processing plants, 9 distribution centers and 5 vending warehouses in 12 states, aggregating 137,200 sq. ft. of floor space.

Subsidiaries: Company has numerous subsidiaries operating in the same general field.

Officers

H. B. Johnson, Chmn. & President
F. M. Barrett, Senior Vice-Pres.

Exec. Vice-Presidents

D. R. Shaughnessy	A. A. Stambaugh, Jr.

Group Vice-Presidents

G. F. Laue	H. J. Kelly
L. M. Bell, Jr.	A. J. Imperiali
W. W. Lee, Jr.	

Vice-Presidents

Pierre Franey	J. K. Delahunt
A. F. Barrett	P. J. Erceg
V. E. Burke	R. M. Hamilton
F. J. Lionette	D. G. Friedl
B. W. Smith	J. M. Mosser
W. W. Curcio	W. P. Pendergast
S. M. Sack	R. M. MacKinnon
J. A. Lucas	D. F. Pierce

E. J. Andlauer, Vice-Pres. & Treas.
E. J. Durgin, Vice-Pres. & Sec.
E. J. Gallagher, Vice-Pres. & Contr.

Directors: H. B. Johnson, C. M. Enders, R. C. Damon, E. J. Durgin, Fred Smith, Hoyt Ammidon, A. A. Stambaugh, J. H. Rambin, Jr., D. R. Shaughnessy.

Counsel: Herrick, Smith, Donald, Farley & Ketchum, Boston.

Auditors: Price Waterhouse & Co.

Annual Meeting: Last Monday in April.

No. of Stockholders: Dec. 31, 1973, 15,700.

No. of Employees: Dec. 31, 1973, 31,000.

Office: 1 Howard Johnson Plaza, Dorchester, Mass. 02125.

Consolidated Income Account, years ended (000 omitted):

	Dec. 29, '73	Dec. 30, '72
Net sales	302,027	262,388
Licensing, etc.	34,424	61,035
Gain assets sold	480	796
Total income	336,931	324,219
Cost of sales, etc.	275,087	256,163
Selling, etc., exp.	11,707	10,400
Depreciation	12,207	10,668
Interest	383	203
(e)Fed. income tax	19,575	17,400
Extraord. credit	(f)3,700	(i)466
Net income	25,178	19,879
Retain. earn., 1-1	108,429	91,593
Dividends (cash)	4,130	3,033
Retain. earn., 12-31	129,467	108,430
(g)Earn., com. sh.	$1.16	$0.92
Yr. end com. shs.	21,851,910	21,723,600

(e)Reduced by $1,033,000 (1972, $731,000) due to invest. tax cred. (f)Gain on sale of real estate, less $717,000 applicable inc. taxes. (g)As reported on 21,819,000 (1972, 21,644,000) aver. shs.; $1.01 (1972, $0.90) bef. extraord. credit. (i)Gain from sale of real estate, less $758,000 loss from discontinuance of N. J. Turnpike opers.

Consolidated Sales & Earnings years ended Dec. 31 ($000):

Yr.	Sales	Net Income	(j)Ave. Com. Shs.	Earn. Av. Com. & P. Sh.
1971	278,030	15,165	19,767	0.77
1970	251,791	(k)11,418	20,930	(k)0.57
1969	258,463	4,979	20,018	0.62
1968	231,425	(k)9,301	19,914	(k)0.45
1967	211,382	9,167	19,187	0.48
1966	200,000	9,305	19,096	0.47

(j)As reported by company.
(k)Before extraordinary gains: 1970, $797,000 ($0.04); 1968, $1,014,000 ($0.05).

Consolidated Balance Sheet, as of (000 omitted):

Assets:	Dec. 29, '73	Dec. 30, '72
Cash	[illegible]	[illegible]
Mkt. sec., cost	[illegible]	[illegible]
Accts. receiv., net	[illegible]	[illegible]
(f)Inventories	[illegible]	13,315
Prepayments	[illegible]	[illegible]
Total current	78,198	74,821
(j)Net property	181,427	99,476
Other assets	1,910	1,550
Total	261,321	175,848
Liabilities:		
Notes, etc., pay.	307	298
Accts. pay., etc.	13,659	13,744
Dividends pay.	1,093	848
Fed. income tax	4,543	4,196
Total current	19,904	18,898
Notes payable	3,524	3,384
Def. inc. taxes	5,336	4,948
Common stk. ($1)	21,852	21,724
Capital surplus	21,338	19,848
Retained earnings	129,467	108,430
Total	261,321	175,848
Net current assets	58,342	56,223
Net tang. com. sh.	$7.06	$4.91
(i)Depreciation	74,523	69,387

(f)Lower over cost or mkt.

Mortgage Debt: Outstg. Dec. 29, 1973, $4,181,000 5%-10% real estate and chattel mortgages due.

Aggregate amount which mature in each of the years 1975-78 are $533,000, $320,000, $272,000 and $276,000, respectively.

Capital Stock: 1. Howard Johnson Co. common; par $1:

AUTHORIZED—30,000,000 shares; outstanding, Dec. 29, 1973, 21,851,910 shs.; reserved for options, 000,692 shs.; par $1.

$1 par shares split 2-for-1, Aug. 7, 1972.

VOTING RIGHTS—Has one vote per share.

PREEMPTIVE RIGHTS—None.

Dividends:

1963-66	(f)...	(f)1967...	$0.19	1968...	$0.22
(f)1969...	0.22	1970...	0.24	1971...	0.24
1972...	0.18				

After 2-for-1 split.

1972...	0.09	1973...	0.18	(j)1974...	0.05

(f)Paid 2% stock dividend in 1963, 1964 and 1965; 2% Mar. 31, 1966 and 100% May 20, 1966; 1967, 1%, May 5, 1969, 100%.

(j)To Jan. 31.

TRANSFER AGENTS—First National Bank of Boston; Chase Manhattan Bank, New York.

REGISTRARS—State Street Bank & Trust Co., Boston; Manufacturers Hanover Trust Co., New York.

OFFERED—(600,000 shares) at $35 a share on May 19, 1961 by Blyth & Co., Inc., New York; F. S. Moseley & Co., Boston, and associates. Offering did not represent company financing.

(310,000 shares) at $31 a share on Mar. 21, 1962 by Blyth & Co., Inc., New York, and associates. Offering did not represent company financing.

(330,000 shares) at $80 a sh. on Mar. 28, 1963 by Blyth & Co., Inc. and Glore Forgan, Wm. R. Staats Inc., NYC; F. S. Moseley & Co., Boston, and associates. Offering did not represent new financing.

(650,000 shares) at $48 a sh. on Aug. 17, 1967 to Blyth & Co., Inc., F. S. Moseley & Co. and Alex. Brown & Sons and associates. Offering did not represent new financing.

(600,000 shares) at $26.37 a sh. on Feb. 23, 1971 by Blyth & Co., Inc., F. S. Moseley & Co. and Alex. Brown & Sons and associates. Proceeds for expansion and working capital.

(1,130,000 shares) at $24.625 a sh. on Sept. 20, 1972 thru Blyth Eastman Dillon & Co., Inc., F. S. Moseley & Co. and Alex. Brown & Sons and associates. Offering does not represent new financing as 800,000 shs. were offered by the estate of the late Howard D. Johnson, founder, and 330,000 shs. by Mrs. Dorothy Weeks, his daughter.

(430,000 $1 par shs.) at $16.25 a sh. on June 20, 1973 thru Blyth Eastman Dillon & Co., Inc., F. S. Moseley, Estabrook, Inc. and Alex. Brown & Sons and associates. Offering did not represent new financing as all the shs. are being sold by Tower Grill of Pennsylvania Inc.

LISTED—On NYSE (Symbol HJ); unlisted trading on Boston, Midwest, PBW, Cincinnati and Detroit Stock Exchanges.

PRICE RANGE—	1973(h)	1972	1971	1970(i)	1969
High	34⅞	23⅝	48⅝	23⅜	28½
Low	10	22⅝	20⅝	11⅛	17⅞

(h)After 100% stk. div.; before, 58-45.
(i)After 2-for-1 split; before, 30⅝-37⅞.

INSILCO CORP.

History: Incorporated in Connecticut Apr. 30, 1946 as International Silver Co., present name adopted Apr. 10, 1969. Effective July 1, 1946, was merged with and became successor to corporation of similar name incorporated in New Jersey, Nov. 19, 1898, latter formed to acquire all property, business and assets of a number of silverware manufacturing companies, the earliest founded in 1808. For list of companies acquired, see Moody's 1949 Industrial Manual.

In the 1946 merger a recapitalization was also effected by exchange of 4 $25 par preferred shares for each $100 par share and exchange of 4 $25 par common shares for each $50 par share.

In Mar., 1958, purchased Times Wire & Cable Co., Inc. (now a subsidiary).

In Jan. 1959 acquired certain assets of Eyelet Specialty Co., Waterbury, Conn. (sold in 1973).

On Oct. 31, 1959 acquired assets of Ensinwood-Moulley Corp., Belleville, N. J. (sold in 1967) and affiliate Drycur Felt Co., Staffordville, Conn. (Drycur Felt Co., a subsidiary, was sold in 1964). In Dec., 1961, acquired Church Metalware division of Benziger Bros., New York.

In Aug. 1962, acquired W. H. Hutchinson & Son, Inc., Chicago, for about $3,000,000 cash (now a subsidiary).

In Nov. 1964, acquired Steel Parts Corp., Indianapolis, Ind., for about $10,000,000 cash.

In Apr. 1966, acquired Hawthorne Metal Products, Co., Royal Oak, Mich.

In May 1966, acquired United Tool & Plastics, Inc. Bridgeport, Conn., through a pooling of interests (sold with Eyelet Specialty Co., Inc. in 1973).

In Aug. 1967, organized World Tableware Corp. which in turn purchased a controlling interest in International Tableware Industrial Corp. of Taiwan.

On Sept. 18, 1967 merged Taylor Publishing Co., Dallas, Tex. by issuance of 1,181,191 shares convertible ser. A second preferred in exchange for a like number of Taylor common shares. Company acquired remaining 154,381 Taylor common shares for $3,857,000 cash.

In Apr. 1968, acquired Stewart Stamping Corp., Yonkers, N. Y. and American Components, Inc.

In Jan. 1969 company acquired Enterprise Paint Co., Chicago, Ill. thru exchange of $100 of convertible debenture 5½s for each 3 Enterprise common shares.

In May, 1969, a subsidiary acquired Kennikat Press, Inc., Port Washington, N. Y. In June, 1969, acquired Stanley Roberts Co., New York City, and its affiliate, Gifts, Inc. (Stanley Roberts, Inc. and Kennikat Press, Inc. sold in 1973).

In Aug., 1969, formed One Way Tableware Corp., Wallingford, Conn.

In Feb. 1970 acquired Peerless Wire Goods Inc. Lafayette, Ind.

In Feb. 1970 acquired Zephyr American Corp.

In 1970 acquired Frisch & Co., Inc., Paterson, N. J.

On May 11, 1970, Taylor Publishing Co. acquired Dukane Press, Inc. at $5 a sh. for each 33,766 shs. of Dukane (now operated as International Graphics, Inc.)

In Oct., 1970 acquired Massasoit Trading Co., Holyoke, Mass.

In Apr., 1971 acquired Sinclair Paint Co., Los Angeles and McDonald Products Corp., Buffalo, N. Y.

In May, 1971 acquired Red Devil Paints, Inc., and Red Devil Chemicals Inc., Mt. Vernon, N. Y.

On June 8, 1971 acquired Roth Greeting Cards, Canoga Park, Calif. Through exchange of 0.3 common share for each Roth common share.

In Aug. 1971 acquired Interlex Punch & Die Corp.

In Sept. 1971 acquired Woolley Paint Co.

In June 1972 acquired Miles Homes Companies for $1,500,000 in cash and $25,000,000 in convertible subordinated notes.

In 1972 acquired Connoisseur Studio, Inc., A & B Tool Co., and Tobey Color Card Co. for an aggregate 283,300 shares of common stock.

In 1972 sold International Silver Co. of Canada Ltd.

Divestiture: In connection with 1971 Justice Dept. civil suit alleging Co.'s 1969 acquisition of Stanley Roberts, Inc. violated antimerger section of Clayton Antitrust Act and that acquisition illegally eliminated competition between 2 Cos. in sale of stainless steel flatware and increased concentration among sellers of flatware, Co. sold Stanley Roberts in 1973.

Business: Company is a diversified operating company with subsidiaries engaged in manufacture of CATV cable and assemblies, stampings for electronics/electrical industry, resistors and capacitors, automotive, truck and farm equipment parts, paints, high school and college yearbooks, financial and commercial printing, greeting cards, hobby crafts, office and desk-top accessories, crown bottle caps, coated wire baskets and racks used in appliances, tableware, and instructions, materials and financing for "do-it-yourself" home building.

Business Week index

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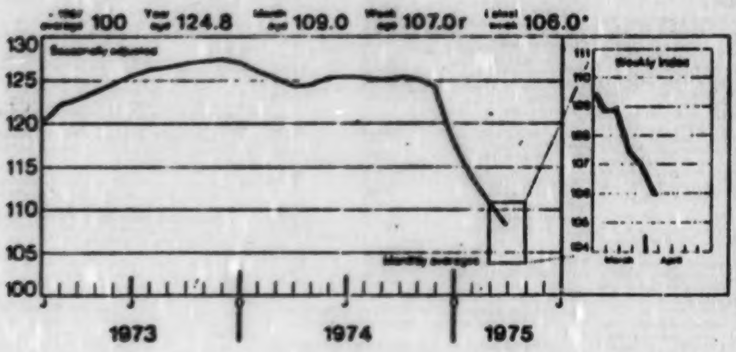

The index dropped sharply for the week ended Apr. 5. After seasonal adjustment, truck output fell sharply as Ford closed four plants for inventory adjustment. Auto assemblies decreased substantially, hampered by a snowstorm in Michigan. Paper and paperboard production continued to decline for the third consecutive week. Losses were also posted in steel, lumber, electric power, intercity trucking, and rail freight. Crude-oil refinery runs turned up significantly after three weeks of declines. Bituminous coal output increased slightly, after adjustment for a miners' holiday.

Figures of the week

		Latest week	Previous week	Month ago	Year ago	1967 average
Production						
Raw steel/Amer. Iron & Steel Inst., thous. of net tons	Apr. 12	2,541	2,563 #	2,718	2,904	2,440
Automobiles/Ward's Automotive Reports	Apr. 12	130,886	118,475r #	130,834	133,889	142,438
Trucks/Ward's Automotive Reports	Apr. 12	42,485	34,102r #	41,128	44,703	30,490
Electric power/Edison Elec. Inst., millions of kilowatt-hours	Apr. 12	34,348	34,684 #	36,199	33,280	23,169
Crude oil, refinery runs/Amer. Pet. Inst., daily av., thous. of bbl	Apr. 12	11,753	12,031r #	11,953	11,808	9,815
Bituminous coal/Bureau of Mines, thous. of net tons	Apr. 5	11,245#	11,920r	12,885	11,280	10,627
Paperboard/Amer. Paper Inst., thous. of tons	Apr. 12	449.5	402.4 #	443.9	587.8	438.8
Paper/Amer. Paper Inst., thous. of tons	Apr. 5	375.0#	395.0r	398.0	554.0	402.8
Lumber/WWPA¹, SFPA², 225 mills, millions of feet	Apr. 5	177.6#	181.9	182.5	264.2	186.4
Trade						
Rail freight traffic/Assn. of Amer. RRs, billions of ton-miles	Apr. 5	14.2#	13.8	14.8	16.5	13.8
Intercity truck tonnage/Amer. Truck Assn. Inc., unadj., index	Apr. 5	84#	84	87	105	100
Retail sales/Census Bur., unadj., in millions	Apr. 5	$10,688	$11,013r	$10,279	$10,078	$6,035
Department store sales/Census Bur., unadj., in millions	Apr. 5	$994	$1,094r	$935	$1,018	$527
Prices						
Industrial raw materials, 13 spot commodities/BLS, Tues. index	Apr. 8	184.6	185.4	182.7	238.8	100
Foodstuffs, 9 spot commodities/BLS, Tues. index	Apr. 8	225.2	232.8	227.1	217.2	100
Finished steel composite/Iron Age, lb	Apr. 14	13.028¢	12.928¢	12.928¢	10.033¢	6.464¢
Copper/electrolytic, del., Metals Week, lb	Apr. 12	64.2¢	64.2¢	64.2¢	68.6¢	38.6¢
Aluminum, primary ingot/major U.S. producer, Metals Week, lb	Apr. 12	39.0¢	39.0¢	39.0¢	31.9¢	25.0¢
Wheat/No. 2 hard, Kansas City, Grain Market Review, bu	Apr. 12	$3.85	$4.03r	$3.78	$4.20	$1.68
Cotton/strict low middling 1-1/16 in., USDA, lb	Apr. 16	38.47¢	38.69¢	37.48¢	64.11¢	25.20¢
Gold/Wed. final setting, London open mkt., troy oz.	*Apr. 16	$166.500	$173.100	$178.500	$169.900	$35.000
Finance						
Prime commercial paper rate/dealer, 91-119 days, Fed. Res.	Apr. 12	6.18%	6.03%	6.08%	9.70%	NA
AA corporate bond yield/S&P	Apr. 16	8.93%	8.96%r	8.77%	8.24%	5.66%
Euro-dollar rate/3-month, Fed. Res.	Apr. 9	7.44%	6.98%	6.81%	10.13%	5.38%
Money supply (M₁)/Fed. Res., seas. adj., in billions	Apr. 2	$287.6	$287.3r	$285.2	$276.4	$181.7
Commercial, industr., and ag. loans†/Fed. Res., in millions	Apr. 9	NA	$129,377	$128,703	$122,833	$64,471
Free reserves/Fed. Res., in millions	Apr. 9	$90	$261r	$205	-$1,091	$195

Monthly figures		Latest month	Month ago	Year ago	1967 average
Housing starts/Comm. Dept., seas. adj. annual rate, in thous.	February	977	998r	1,881	1,292
Personal income/Comm. Dept., seas. adj. annual rate, in billions	February	$1,194.8	$1,191.1r	$1,113.4	$629.3
Wholesale & retail inventories/Comm. Dept., seas. adj., in billions	January	$120.2	$121.4r	$104.3	$60.5

Used in computing Business Week index (chart); other components (not listed) are machinery, defense & space equipment

* Preliminary, week ended [illegible] † Reporting member banks r Revised NA Not available

¹ Western Wood Products Association ² Southern Forest Products Association

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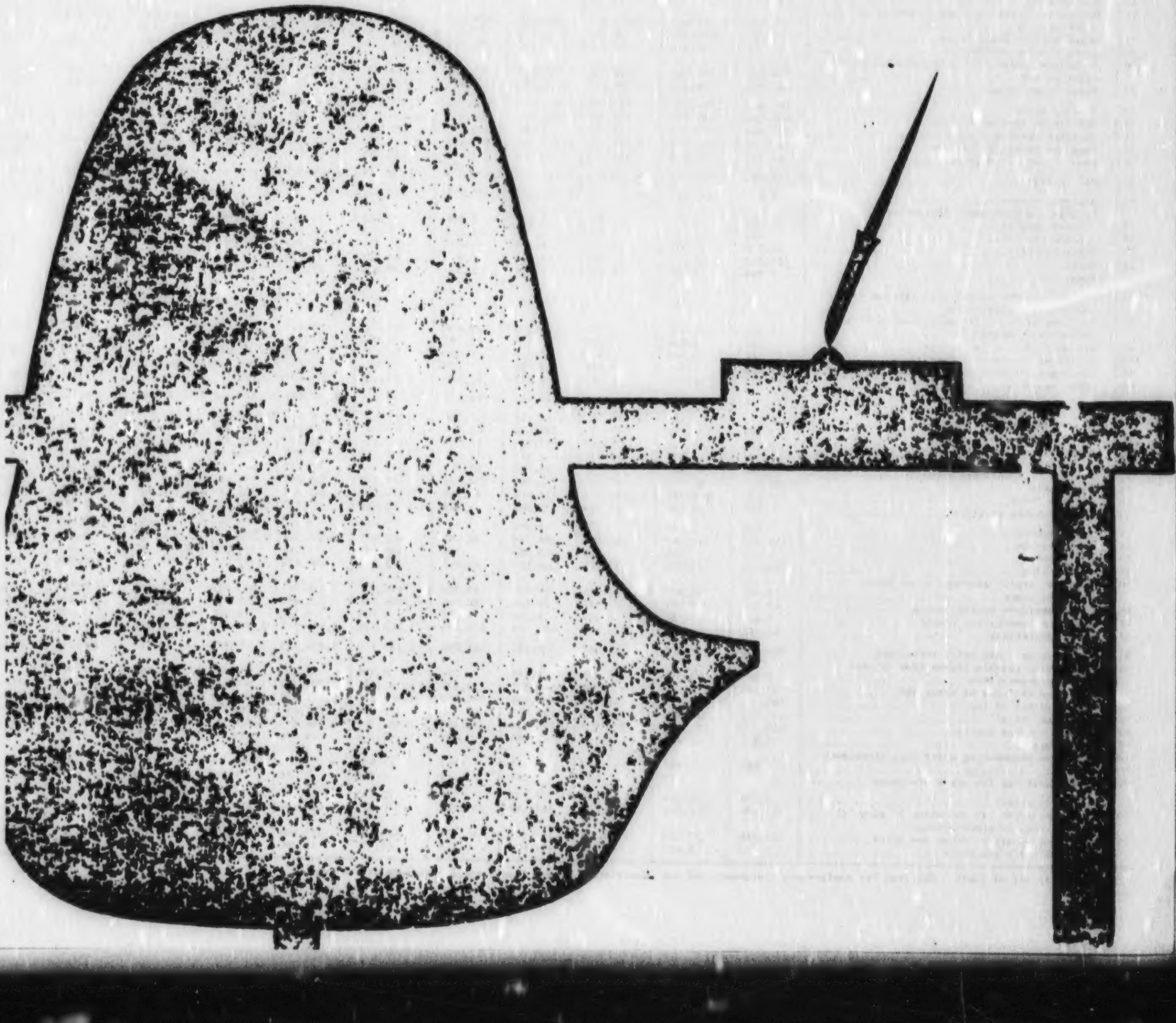
STATISTICS OF INCOME 1970

CORPORATION INCOME TAX RETURNS

Internal Revenue Service

Publication 16 (4-74)



RETURNS WITH NET INCOME

Table 3.--BALANCE SHEETS AND INCOME STATEMENTS, BY MAJOR INDUSTRY--Continued

[All figures are estimates based on samples--money amounts are in thousands of dollars]

Item	Major industry--Continued										
	Manufacturing--Continued										
	Tobacco manufactures	Textile mill products	Apparel and other fabricated textile products	Lumber and wood products, except furniture	Furniture and fixtures	Paper and allied products	Printing and publishing	Chemicals and allied products	Petroleum refining and related industries	Rubber and miscellaneous plastics products	Leather and leather products
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
1 Number of returns with net income	61	4,465	12,055	5,410	4,229	2,615	15,863	6,306	667	3,134	1,493
2 Total assets	6,108,768	12,047,391	8,778,061	9,217,123	3,244,492	19,463,566	16,895,311	49,188,770	91,090,933	10,065,667	2,774,625
3 Cash	138,661	558,076	605,507	369,844	205,731	322,306	1,092,680	1,679,939	1,710,583	631,016	162,307
4 Notes and accounts receivable	467,663	3,197,006	2,734,269	1,396,332	895,670	2,678,761	3,976,160	9,228,667	15,195,142	2,453,635	712,493
5 Less: Allowance for bad debts	6,631	38,304	39,862	23,889	18,766	70,587	338,684	160,392	226,420	48,731	10,918
6 Inventories	2,343,444	2,905,488	2,880,193	1,473,032	903,607	2,734,879	1,803,225	8,888,675	3,657,617	2,276,971	712,859
Investments in Government obligations:											
7 United States	1,001	32,149	22,926	21,944	46,943	138,910	201,616	335,673	873,028	39,275	8,120
8 State and local	1,733	37,729	8,217	25,617	24,633	72,373	131,372	126,668	95,536	36,423	16,525
9 Other current assets	70,637	233,943	268,178	248,436	84,651	506,197	751,590	1,266,332	2,331,274	88,868	50,126
10 Loans to stockholders	225	9,907	48,606	13,776	6,394	25,113	64,123	26,174	98,738	20,619	6,199
11 Mortgage and real estate loans	508	19,258	7,253	7,641	3,533	283,808	17,836	20,983	84,137	639	3,926
12 Other investments	1,606,353	1,027,124	797,612	797,337	270,775	2,679,308	2,512,035	7,712,557	19,957,832	1,009,606	360,880
13 Depreciable assets	1,636,870	7,788,074	2,019,383	6,022,564	1,347,621	15,202,882	8,400,679	35,910,319	63,615,271	6,426,306	849,602
14 Less: Accumulated depreciation	412,150	4,024,812	965,668	2,648,605	646,713	6,764,361	3,838,343	18,287,426	31,577,565	3,090,238	447,630
15 Depletable assets	64,383	361	577	1,069,186	3,088	867,672	91,583	308,031	6,716,815	16,563	3
16 Less: Accumulated depletion	-	113	-	41,481	873	158,389	13,637	138,193	2,900,795	5,817	3
17 Land	27,746	77,977	59,873	186,099	36,856	380,545	393,996	813,777	3,179,279	117,114	27,460
18 Intangible assets (amortizable)	6,709	17,165	15,477	5,531	4,087	29,751	128,227	361,612	7,637,686	24,322	881
19 Less: Accumulated amortization	1,301	6,384	7,142	2,979	2,200	13,295	48,878	101,927	4,140,685	12,658	637
20 Other assets	364,957	192,987	302,464	296,740	59,335	349,699	1,569,913	1,399,101	2,987,444	283,576	122,238
21 Total liabilities	6,108,768	12,047,391	8,778,061	9,217,123	3,244,492	19,463,566	16,895,311	49,188,770	91,090,933	10,065,667	2,774,625
22 Accounts payable	231,985	1,454,828	1,793,762	647,802	378,390	1,510,814	1,605,516	4,625,011	7,933,056	1,010,725	320,613
23 Mortgages, notes, and bonds payable in less than one year	770,920	1,292,401	953,601	636,248	238,742	960,836	971,738	1,780,636	2,089,934	868,922	248,762
24 Other current liabilities	371,138	666,359	722,723	630,472	257,753	1,579,290	1,513,497	3,158,635	3,775,329	917,165	193,783
25 Loans from stockholders	27	58,516	118,511	67,050	59,236	72,303	168,016	200,679	52,486	77,391	16,531
26 Mortgages, notes, and bonds payable in one year or more	1,190,589	1,581,817	838,256	1,989,442	312,622	4,091,702	2,360,285	9,276,108	13,662,962	2,013,368	310,371
27 Other liabilities	185,368	176,073	164,941	465,606	45,038	748,264	1,189,091	1,391,875	7,318,732	233,892	104,651
28 Capital stock	764,560	1,229,995	959,091	1,251,819	463,354	2,241,691	1,866,316	5,341,019	10,956,103	635,191	452,569
29 Paid-in or capital surplus	360,956	627,707	551,802	1,050,173	182,880	2,050,537	1,339,768	5,823,802	12,653,878	995,638	228,773
30 Retained earnings, appropriated	195,056	24,711	12,762	7,395	13,471	322,160	59,801	181,896	559,093	33,397	2,321
31 Retained earnings, unappropriated	2,161,302	5,089,088	2,729,773	2,725,509	1,346,608	6,019,067	6,309,762	17,667,167	32,616,162	3,370,668	987,135
32 Less: Cost of treasury stock	83,333	154,102	107,159	76,463	33,822	113,098	246,657	438,058	324,780	90,451	90,684
33 Total receipts	7,177,881	17,926,476	19,308,094	10,611,605	6,450,819	20,159,185	22,546,849	55,290,267	79,216,964	13,985,434	4,550,187
34 Business receipts	7,082,610	17,673,975	19,117,502	10,336,803	6,369,130	19,439,346	21,840,342	53,321,068	73,776,387	13,690,983	4,437,512
Interest on Government obligations:											
35 United States	248	5,279	1,273	2,232	2,606	5,010	16,987	25,491	66,986	2,376	280
36 State and local	361	1,979	1,036	1,508	1,126	7,368	12,248	12,724	8,099	867	778
37 Other interest	31,026	63,370	40,613	48,150	11,607	125,055	95,361	232,916	650,832	41,828	11,641
38 Rents	21,093	26,723	11,816	18,264	7,050	63,879	75,806	71,216	619,563	18,727	4,297
39 Royalties	7,868	10,080	29,950	7,549	1,063	38,856	62,370	304,381	85,352	24,952	2,055
40 Net short-term capital gain reduced by net long-term capital loss	1	63	855	476	126	633	827	4,131	11,387	243	78
41 Net long-term capital gain reduced by net short-term capital loss	1,547	25,105	4,724	368,738	3,479	285,749	60,862	251,579	163,277	29,897	38,879
42 Net gain, noncapital assets	387	3,818	2,368	21,623	1,792	4,975	11,369	25,888	42,735	3,776	686
43 Dividends, domestic corporations	11,366	12,296	6,003	2,344	2,188	22,270	39,955	84,265	967,197	5,238	16,466
44 Dividends, foreign corporations	3,932	7,311	3,429	8,288	705	56,906	14,606	633,307	831,216	89,259	664
45 Other receipts	17,224	96,277	88,565	75,650	49,928	129,160	316,096	683,281	1,991,935	77,312	36,853
46 Total deductions	6,286,744	16,955,376	18,464,367	10,073,451	6,068,234	18,997,552	20,742,066	50,350,440	74,676,380	13,366,121	4,259,737
47 Cost of sales and operations	4,036,510	13,476,955	14,487,792	7,361,639	4,313,684	13,368,618	13,696,827	32,676,426	50,011,525	9,562,551	3,265,493
48 Compensation of officers	17,369	236,476	467,129	187,683	192,867	165,702	633,087	612,718	106,855	161,535	78,678
49 Repairs	37,982	144,915	39,766	91,862	27,437	448,659	120,169	767,850	1,186,421	181,377	28,218
50 Bad debts	2,799	28,400	25,971	16,977	15,412	32,658	127,909	96,140	238,332	62,401	8,037
51 Rent paid on business property	63,586	163,809	188,134	66,764	65,320	209,622	280,382	476,895	1,232,638	176,663	56,993
52 Taxes paid	1,020,587	383,898	389,690	286,390	132,024	679,082	362,822	1,096,627	4,269,383	390,595	106,202
53 Interest paid	133,654	250,328	186,110	151,666	46,094	377,105	243,940	736,589	1,210,667	208,809	52,863
54 Contributions or gifts	4,523	10,936	13,529	5,096	4,093	12,318	31,735	65,198	29,744	6,377	4,825
55 Amortization	928	1,554	874	6,585	297	8,936	8,518	7,379	18,806	1,821	252
56 Depreciation	126,515	543,167	165,028	388,278	98,581	872,469	588,108	2,388,177	2,874,121	459,721	57,139
57 Depletion	1,458	136	233	408,366	138	126,690	9,361	116,228	2,777,080	1,848	119
58 Advertising	358,377	115,213	135,068	48,165	66,423	172,573	280,679	2,267,691	371,596	173,908	66,136
59 Pension, profit sharing, stock bonus, annuity plans	55,969	95,815	86,786	42,305	43,303	149,286	212,701	615,728	471,315	172,716	30,368
60 Other employee benefit plans	41,559	49,258	57,587	28,664	25,696	106,396	113,676	295,932	212,086	123,500	20,920
61 Net loss, noncapital assets	1,467	7,738	1,067	3,326	1,396	1,003	7,797	6,152	31,765	1,503	338
62 Other deductions	383,481	1,666,776	2,223,603	979,905	813,471	2,468,213	3,906,577	8,540,712	9,636,230	1,726,816	485,176
63 Total receipts less total deductions	891,137	971,102	843,767	538,154	382,585	1,161,633	1,806,783	4,939,807	4,540,584	619,313	290,450
64 Constructive taxable income from related foreign corporations	2,508	3,590	2,336	4,191	171	36,919	9,207	233,381	106,686	17,026	692
65 Net income (63 plus 64 minus 36)	893,286	972,713	845,089	540,837	381,630	1,191,206	1,801,762	5,160,664	4,637,169	635,690	290,164
66 Income subject to tax	880,773	916,657	748,985	498,556	355,830	1,164,270	1,651,690	4,981,699	3,677,062	606,185	259,627
67 Income tax, total[1]	433,052	435,432	339,972	179,281	162,546	502,506	788,655	2,389,830	1,982,973	286,270	116,726
68 Normal tax and surtax	422,273	421,764	330,933	170,356	158,626	486,263	768,263	2,321,861	1,732,891	276,530	112,658
69 Surcharge	10,515	12,765	8,167	4,468	3,031	12,586	18,596	53,396	43,631	7,397	3,378
70 Tax from recomputing prior year investment credit	265	687	218	389	163	693	1,3[illegible]	10,106	1,619	1,475	308
71 Additional tax for tax preferences	-	23	9	3,829	2	4,891	126	4,179	145,027	555	563
72 Investment credit	3,406	10,036	1,440	7,637	729	32,132	11,150	83,377	96,763	12,340	312
73 Net income after tax (65 minus 67 plus 72)	463,616	547,317	506,537	369,193	219,809	720,830	1,066,237	2,856,011	2,808,939	361,360	173,750
Distributions to stockholders:											
74 Cash and property except own stock	274,789	227,123	97,192	190,317	45,156	489,481	395,606	1,963,200	3,148,770	206,086	53,099
75 Corporation's own stock	13	8,037	16,135	101,628	5,918	60,917	18,080	89,616	72,861	16,288	9,297

Footnotes at end of table. See text for explanatory statements and for "Description of the Sample and Limitations of the Data."

SECTION C

USING INFLATION INDEXES

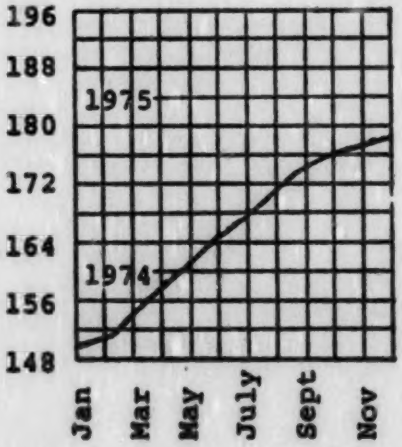
Fluctuations in the inflation rate affect both the purchase price of replacement equipment and annual operation and maintenance costs. Estimates of the cost of compliance must be adjusted accordingly.

INDEXING INFLATION

The civil assessment formula already takes the rate of inflation into account in estimating the costs of compliance. You must adjust the figure used each year to reflect the averate rate over the previous three years. You may use any source of information deemed appropriate by the Commissioner in order to calculate the rate. At present, the best source is the CE Plant Cost Index, published in the trade journal Chemical Engineering. It contains four major components:

1. Equipment machinery and supports;
2. Construction labor;
3. Building materials and labor;
4. Engineering supervision and manpower.

CE Plant Cost Index (1957-59 = 100)



Annual Index

1969 = 119.0

1970 = 125.7

1971 = 132.2

1972 = 137.2

1973 = 144.1

1974 = 165.4

CALCULATING THE RATE OF INFLATION

Using the CE Plant Cost Index, the rate of inflation (RI) to be used in the formula in 1975 would be 7.9 percent, calculated as follows:

(1) Find the average inflation rates for each of the previous three years by dividing each increase in the "index" rate by the base index rate:

The 1972 inflation rate equals $\frac{5}{132.2}$ or 3.8%

The 1973 inflation rate equals $\frac{6.9}{137.2}$ or 5.0%

The 1974 inflation rate equals $\frac{21.3}{144.4}$ or 14.8%

(2) Average each of these inflation rates.

The three year average equals 7.9%

SECTION D

ESTIMATING THE SOURCE'S INCOME TAX RATE

You will want to adjust the 48 percent tax rate assumption of the civil assessment formula for certain corporations and all individuals, partnerships and municipalities. (Regulatees with lower income tax liability are liable to significantly higher economic assessments than others.)

Corporations

There are three types of corporations that may have low income tax rates: (1) companies operating at a loss, (2) companies with extraordinary deductions or credits and (3) very small companies.

1. Corporations operating at a loss will be able to use accumulated tax advantages when they become profitable. There is no need to adjust the formula for this type of corporation.

2. Corporations with extraordinary deductions or credits are now generally confined to the extractive industries, including oil producing companies. In such a case, obtain the company's effective tax rate (the percent of its total pre-tax profit it pays in tax) and use it in the formula.

3. Very small corporations are taxed at lower rates currently (1975):

20% for the first $25,000 of taxable income;
22% for the second $25,000 of taxable income;
48% for taxable income over $50,000.

Unless this schedule is extended or otherwise changed, the rates in 1976 will revert to:

22% for the first $25,000 of taxable income;
26% for the second $25,000 of taxable income;
48% for taxable income over $50,000.

Where a corporation's taxable income is sufficiently low that its overall rate deviates substantially from 48 percent, you should obtain and use the company's actual effective tax rate.

Individuals and Partnerships

You should make an initial assumption of a 19 percent rate for individuals and an 18 percent rate for partnerships. These figures are based on averages, and are probably low estimates for most regulatees likely to be subject to civil assessments.

Municipalities and Non-Profit Institutions

When dealing with such entities, adjust the formula to assume a zero tax rate.

OBTAINING INDIVIDUAL RATES

1. For publicly held companies, you can find the necessary information in Moody's Industrial Manual, Standard and Poor or the Value Line Investment Survey. The first two are in the State Library.

2. For businesses, you should request the most recent balance sheets and income statements -- as you are empowered to under the regulations.

3. For individuals, you should request the most recent income tax statement. An individual is not obliged to provide this for you, but since the initial assumption is probably lower than his actual rate, he will probably comply with your request voluntarily.

ADJUSTING THE FORMULA FOR CHANGES IN THE TAX LAWS

From time to time provisions in the tax laws are changed. If such a change comes to your attention, consult Chapter I of Part 3 of this volume of the CEP Final Report in order to find precisely where the appropriate adjustments in the formula should be made.

SECTION E

HOW TO USE THE WANG CALCULATOR

A calculator provides a rapid, accurate, and low cost method of determining civil assessments. Connecticut is using a Wang Model 600 calculator for this purpose. If you do not have access to this machine, you can calculate assessments by hand with the formula given in Part III, Chapter I of this Volume. Also, in many cases, the Wang program can be adapted to be used on other programmable calculators. You should consult the User's Manual for whatever machine is available.

This section:

* Summarizes how the program works

* Explains how to place Connecticut's civil assessment formula on the Wang Model 600 calculator tape

* Explains how to run the program once a civil assessment tape is placed in the calculator.

HOW THE PROGRAM WORKS

The Wang program operates in several steps:

* It must have or be given information regarding each of the following variables:

  - CCE = The cost of installed pollution abatement equipment
  - OP = The cost of operating and maintaining control facilities
  - RI = The average rate of inflation over the last three years
  - EL = The expected life of needed pollution abatement equipment
  - T = The tax rate applicable to the source
  - TC = The Federal tax credit for purchasing pollution abatement facilities

- DL = The shortest allowed depreciable life (5 years or EL, whichever is shorter)
- CC = The cost of capital applicable to the source

The variable TC is programmed onto the tape and adjusted periodically as needed.* Other inputs, notably EL and T are typically also fixed values, but they may be changed in particular cases. The other inputs cannot have values entered directly onto the tape; this information must be given the machine case by case.**

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* If the value of TC in the program is not the same as the actual tax credit given by the Federal Government, for example, you should change steps 0113 to 0116 so that they correctly input the value (1-TC). If TC was 10 percent (and (1-TC) = 90 percent), for example, these steps would read:

Step	Code	Symbol	Key	Comment
0116	0010	E10	.	
0117	0009	E9	9	
0118	0000	E0	0	
0119	0214	+14	+R	Add .90

In fact, the value used in this program may now be incorrect. As of September, 1975, the tax credit rate was 10 percent, but because the tax credit is scheduled to revert to 7 percent in January, 1976, the program uses the latter value.

In the absence of reliable information about a specific piece of equipment, assume EL to be ten years. This represents a reasonable approximation of estimates obtained from IRS Asset Guideline Classes of industrial equipment for industries in Connecticut. Input the value of "Depreciable Life" (DL) as either 5 years (the period of time allowed by the Federal tax code for write-off of pollution equipment) or the Expected Life (EL) of the equipment, whichever is shorter.

** Although Connecticut's program does not automatically enter the value either of DL or of RI into the calculator, the program could be easily altered to do so.

- It automatically checks to make sure that:
  - The cost of capital is greater than the rate of inflation (CC > RI)
  - Both the cost of capital and the rate of inflation have been entered in decimal format.

  When either of these relations is faulty, the calculator will place a negative number in the window and will print no information until all input information is correctly entered.

- It calculates the values of (1+RI)/(1+CC), PVO, PVIE, PVE, A, and the civil assessment, CA. (For an explanation of the above variables and of the input variables, please refer to Part III, Chapter I, of this Volume.)

- Finally, the program prints out the variables used in the formula and CA, the monthly assessment liability incurred by a source for failure to comply.

To aid understanding of this Section, a diagram of a Wang keyboard is included on page V-175.

PROGRAMMING THE CALCULATOR

To place this program in the memory banks of the Wang, follow these steps:

(1) Start the calculator

(2) Press "Clear"

(3) Press "Learn Mode"

(4) Press "Prime"

The calculator is now ready to learn a program, and you may enter any program step by step. The diagram and tables that follow in Attachment A explain exactly what steps should be taken to enter the economic civil assessment program.

Once you have entered the program, you may place the program on tape:

(1) Press "Run Mode"

(2) Place the tape in the cassette holder (label out)

(3) Press "Rewind"

(4) Press "Tape Ready"

(5) Press "Record Prog" (record program)

Each such tape will serve as a portable "memory", obviating the need to enter the program manually in the future. Such tapes have already been prepared, and Phil Florkoski of the Air Compliance Unit, the person who did this programming work, will assist you in making whatever modifications become necessary.

After entering the program you can check that the program has been entered correctly by pressing "VERIFY PROG". The machine will total the code numbers of the steps you have entered and will flash the sum on the screen. The verification number for this program is 3446. If the calculator gives the right answer, you have probably entered the program correctly. You should still check that you have entered the steps in the correct order, however; the check described above will not pick up this mistake.

Note that if the program is changed, the verification number will also change. If the program is altered to input TC as 10 percent with the method suggested above, the code number of step 0118 will decrease by 3 (from 0003 to 0000) and the verification number will become 3443.

Three conventions have been used in this program:

- In some cases, one numerical operation (e.g. storing a particular variable) requires two steps. These two-step operations have been treated as one step. For example, storing a number in "Register 3" is done in two steps: (1) pressing the store key (ST on the keyboard) and (2) pressing the number of the register (03: one of the low order codes).

- The letters L or R appearing in the "Key" column refer to operations performed to the left and right registers, respectively. Step 0036, Total L means that you press the key "Total" on the left side of the keyboard, thus clearing the left register.

- Some steps are "upper-case" keys (e.g. the key "Mark"); to use them you must first press "Shift" on the left side of the keyboard. This step has not been included.

USING THE PROGRAM

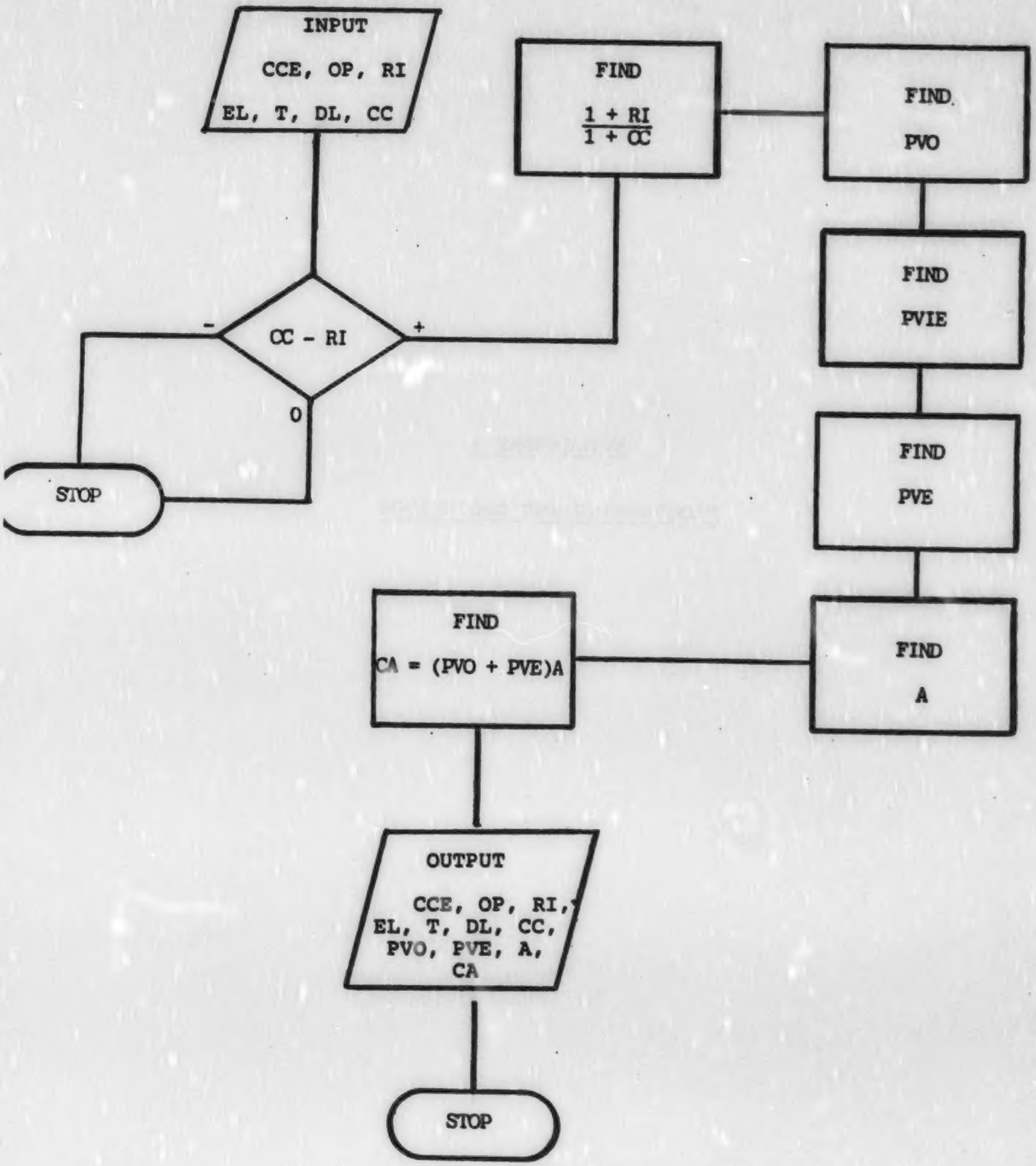
Given a tape of the economic civil assessment program, anyone can calculate assessments with ease. Attachment B provides a step-by-step description of how to do so.

To obtain the input variables you need for the program, refer to other sections of this Chapter. You will find a test of the needed variables in a sample worksheet attached at the end of the Attachment.

ATTACHMENT A

PROGRAMMING THE CALCULATOR

FLOW DIAGRAM FOR THE CIVIL ASSESSMENT CALCULATOR PROGRAM


INPUT
CCE, OP, RI
EL, T, DL, CC
CC - RI
-
+
0
STOP
FIND
$\frac{1 + RI}{1 + CC}$
FIND PVO
FIND PVIE
FIND PVE
FIND A
FIND
CA = (PVO + PVE)A
OUTPUT
CCE, OP, RI,
EL, T, DL, CC,
PVO, PVE, A,
CA
STOP

I. Input Values and Perform Checks

Step*	Code**	Symbol***	Key****	Comment
0000	09 00	* M	Mark	Marks next entry as identification code
0001	08 12	* x^2	x^2	Identification code
0002	06 00	STO	ST	Store CCE in Register 00
0003	00 15	E15	CLD	Clear display
0004	09 03	* SP	Stop	Stop to enter data
0005	06 01	ST1	ST	Store OP in Register 01
0006	00 15	E15	CLD	Clear display
0007	09 03	* SP	Stop	Stop to enter data
0008	06 02	ST2	ST	Store RI in Register 02
0009	00 15	E15	CLD	Clear display
0010	09 03	* SP	Stop	Stop to enter data
0011	06 10	ST10	ST	Store EL in Register 10
0012	00 15	E15	CLD	Clear display
0013	09 03	* SP	Stop	Stop to enter data
0014	06 11	ST11	ST	Store T in Register 11
0015	00 12	E12	CHS	Change sign of T
0016	06 15	ST 15	Store L	Store - T in left register
0017	00 01	E1	1	
0018	02 15	+15	+L	Add 1 to - T
0019	06 12	ST12	ST	Store 1-T in Register 12
0020	01 15	T15	Total L	Clear left register
0021	00 15	E15	CLD	Clear display
0022	09 03	* SP	Stop	Stop to enter data

---

* The step number for each step of the program.

** The code number of each step (used in the User's Guide and in most cases, on the keyboard).

*** The symbol used in the Wang User's Guide for each step.

**** Keyboard symbol indicating which key is to be pressed when entering the program.

Step	Code		Symbol	Key	Comment
0023	06	13	ST 13	ST	Store DL in Register 13
0024	00	15	E15	CLD	Clear display
0025	09	03	*SP	STOP	Stop to enter data
0026	06	03	ST3	ST	Store CC in Register 03
0027	06	15	ST15	Store L	Store CC in left register
0028	07	02	RE2	RE	Recall RI
0029	03	15	-15	- L	Find CC - RI
0030	09	04	* J_0	Jif≠0	Skip next 2 steps if answer is not zero
0031	08	03	* Go	GO	
0032	09	03	* SP	Stop	Stop because CC cannot equal RI
0033	08	05	* J_+	Jif +	Skip next 2 steps if answer is positive
0034	08	03	* Go	GO	
0035	09	03	* SP	Stop	Stop because RI cannot be greater than CC
0036	01	15	T15	Total L	Clear left register
0037	07	03	RE3	RE	Recall CC
0038	06	15	ST15	Store L	Store CC in left register
0039	00	10	E10	.	
0040	00	09	E9	9	
0041	00	09	E9	9	
0042	03	15	-15	-L	Find CC - .99
0043	00	12	E12	CHS	Change sign
0044	06	15	ST15	Store L	Store - (CC - .99) in left register
0045	08	05	* J_+	Jif +	Skip next two steps if answer is positive
0046	08	03	* Go	GO	
0047	09	03	* SP	Stop	Stop because CC must be less than 1
0048	01	15	T15	Total L	Clear left register

II. Find Value of (1 + RI)/(1 + CC)

Step	Code	Symbol	Key	Comment
0049	00 01	E1	1	
0050	02 15	+15	+ L	
0051	07 02	RE 2	RE	Recall RI
0052	02 15	+15	+ L	Find 1 + RI
0053	06 15	ST15	Store L	Store 1 + RI in left register
0054	00 01	E1	1	
0055	02 14	+14	+ R	
0056	07 03	RE3	RE	Recall CC
0057	02 14	+14	+R	Find 1 + CC
0058	05 15	÷15	÷ L	Find (1 + RI) / (1 + CC)
0059	06 04	ST4	ST	Store (1 +RI) / (1 + CC) in Register 4

III. Find Value of PVO

Step	Code	Symbol	Key	Comment
0060	08 10	* LN	LOG_eX	Find natural log of (1 + RI) / (1 + CC)
0061	06 15	ST15	Store L	Store in left register
0062	00 02	E2	2	
0063	00 00	EO	0	
0064	04 15	x15	x L	Find 20 (LN (1 + RI) / (1 + CC))
0065	08 11	* e^x	e^x	Find ((1 + RI) / (1 + CC))^{20}
0066	00 12	E12	CHS	Change sign
0067	06 15	ST15	Store L	
0068	00 01	E1	1	
0069	02 15	+15	+ L	Find 1 - ((1 + RI) / (1+CC))^{20}
0070	01 14	T14	Total R	Clear right register
0071	00 01	E1	1	
0072	02 14	+14	+R	
0073	07 03	RE3	RE	Recall CC
0074	02 14	+14	+ R	Find 1 + CC
0075	04 15	x15	x L	Multiply left
0076	07 12	RE12	RE	Recall (1 - T)
0077	04 15	x15	x L	Multiply left
0078	06 15	ST15	Store L	Store value in left register
0079	01 14	T14	Total R	Clear right register
0080	07 03	RE3	RE	Recall CC
0081	06 14	ST14	Store R	Store CC in right register
0082	07 02	RE2	RE	Recall RI

Step	Code		Symbol	Key	Comment
0083	03	14	-14	- R	Find CC - RI
0084	08	15	* 1/x	1/x	Find 1 / (CC - RI)
0085	04	15	x15	x L	Multiply left
0086	06	15	ST15	Store L	
0087	07	01	RE1	RE	Recall OP
0088	04	15	x15	x L	Multiply left
0089	06	05	ST 5	ST	Store value of PVO in Register 05
0090	01	15	T15	Total L	Clear left register
0091	01	14	T14	Total R	Clear right register

IV. Find Value of PVIE

Step	Code		Symbol	Key	Comment
0092	00	01	E1	1	
0093	02	14	+14	+ R	
0094	07	03	RE3	RE	Recall CC
0095	02	14	+14	+ R	Find 1 + CC
0096	08	10	* LN	LOG_eX	Find LN (1 + CC)
0097	06	14	ST 14	Store R	
0098	07	13	RE13	RE	Recall DL
0099	04	14	x14	x R	Find DL (LN (1 + CC))
0100	08	11	$*e^x$	e^x	Find (1 + CC)^{DL}
0101	06	14	ST14	Store R	
0102	08	15	* 1/x	1/x	Find 1/ (1 + CC)
0103	00	12	E12	CHS	Change sign
0104	06	14	ST14	Store R	
0105	00	01	E1	1	
0106	02	14	+14	+R	Find 1 -(1/ (1+CC)^{DL})
0107	07	11	RE11	RE	Recall T
0108	04	14	x14	x R	Multiply by T
0109	06	14	ST14	Store R	
0110	07	13	RE13	RE	Recall DL
0111	05	14	÷ 14	÷ R	Divide by DL
0112	07		RE3	RE	Recall CC
0113	05	14	÷ 14	÷ R	Divide by CC
0114	00	12	E12	CHS	Change sign
0115	06	14	ST14	Store R	
0116	00	10	E10	.	
0117	00	09	E9	9	

Step	Code	Symbol	Key	Comment
0118	00 03	E3	3	
0119	02 14	+14	+ R	Add .93
0120	06 14	ST14	Store R	
0121	07 00	REO	RE	Recall CCE
0122	04 14	x14	x R	Multiply by CCE
0123	06 06	ST6	ST	Store PVIE in Register 06
0124	01 15	T15	Total L	Clear left register
0125	01 14	T14	Total R	Clear right register

V. Find Value of PVE

Step	Code		Symbol	Key	Comment
0126	07	04	RE4	RE	Recall (1 + RI) / (1 + CC)
0127	06	14	ST14	Store R	
0128	08	10	* LN	$LOG_e X$	Find natural log
0129	06	14	ST14	Store R	
0130	00	02	E2	2	
0131	00	00	E0	0	
0132	04	14	x14	x R	Multiply by 20
0133	08	11	* e^x	e^x	Find $((1+RI) / (1 + CC))^{20}$
0134	00	12	E12	CHS	Change sign
0135	06	14	ST14	Store R	
0136	00	01	E1	1	
0137	02	14	+14	+ R	Add 1
0138	06	14	ST14	Store R	Store $1 + ((1+RI)/(1+CC))^{20}$ in right register
0139	07	04	RE4	RE	Recall (1+RI) / (1+CC)
0140	06	15	ST15	Store L	
0141	08	10	* LN	$LOG_e X$	Find natural log
0142	06	15	ST15	Store L	
0143	07	10	RE10	RE	Recall EL
0144	04	15	x15	x L	Multiply by EL
0145	08	11	* e^x	e^x	Find $((1+RI) / (1+CC))^{EL}$
0146	00	12	E12	CHS	Change sign
0147	06	15	ST15	Store L	
0148	00	01	E1	1	
0149	02	15	+15	+ R	Add 1

Step	Code	Symbol	Key	Comment
0150	05 14	÷14	÷ R	Divide left into right
0151	07 06	RE6	RE	Recall PVIE
0152	04 14	x14	x R	Multiply by PVIE
0153	06 07	ST7	ST	Store PVE in register 07
0154	01 14	T14	Total R	Clear right register
0155	01 15	T15	Total L	Clear left register

VI. Find Value of A

Step	Code	Symbol	Key	Comment
0156	07 03	RE3	RE	Recall RI
0157	06 14	ST14	Store R	
0158	00 01	E1	1	
0159	02 14	+14	+ R	
0160	06 14	ST14	Store R	Store 1 + RI in right register
0161	00 01	E1	1	
0162	00 10	E10	.	
0163	00 00	E0	0	
0164	06 15	ST15	Store L	
0165	00 01	E1	1	
0166	00 02	E2	2	
0167	00 10	E10	.	
0168	00 00	E0	0	
0169	05 15	÷15	÷ L	
0170	06 15	ST15	Store L	Store 1.0 / 12.0 in left register
0171	07 14	RE14	Recall R	Recall 1 + RI
0172	08 10	* LN	LOG_eX	Find natural log
0173	06 14	ST14	Store R	
0174	07 15	RE15	Recall L	
0175	04 14	x14	x R	Multiply by 1.0 / 12.0
0176	08 11	* e^x	e^x	Find $(1 + CC)^{(1/12)}$
0177	06 14	ST14	Store R	
0178	00 01	E1	1	
0179	03 14	-14	- R	Subtract 1
0180	06 14	ST14	Store R	Store $(1+CC)^{(1/12)} -1$ in right register

Step	Code	Symbol	Key	Comment
0181	01 15	T15	Total L	Clear left
0182	00 01	E1	1	
0183	00 10	E10	.	
0184	00 00	E0	0	
0185	06 15	ST15	Store L	
0186	07 03	RE3	RE	Recall CC
0187	02 15	+15	+ L	Find 1 + CC
0188	08 10	* LN	LOG_eX	Find natural log
0189	06 15	ST15	Store L	
0190	00 02	E2	2	
0191	00 00	E0	0	
0192	04 15	x15	x L	Multiply by 20
0193	08 11	* e^x	e^x	Find $(1 + CC)^{20}$
0194	08 15	* 1/x	1/x	Find $1 / ((1 + CC)^{20})$
0195	00 12	E12	CHS	Change sign
0196	06 15	ST15	Store L	
0197	00 01	E1	1	
0198	02 15	+15	+ L	Find $1 - (1 / ((1+CC)^{20}))$
0199	05 14	÷14	÷ R	Divide right
0200	06 08	ST8	ST	Store A in Register 08
0201	01 15	T15	Total L	Clear left register
0202	01 14	T14	Total R	Clear right register

VII. Find Value of CA

Step	Code		Symbol	Key	Comment
0203	07	05	RE5	RE	Recall PVO
0204	06	15	ST15	Store L	
0205	07	07	RE7	RE	Recall PVE
0206	02	15	+15	+ L	Find PVO+PVE
0207	07	08	RE8	RE	Recall A
0208	04	15	x15	x L	Find (PVO + PVE) A
0209	06	09	ST 9	ST	Store CA in Register 09

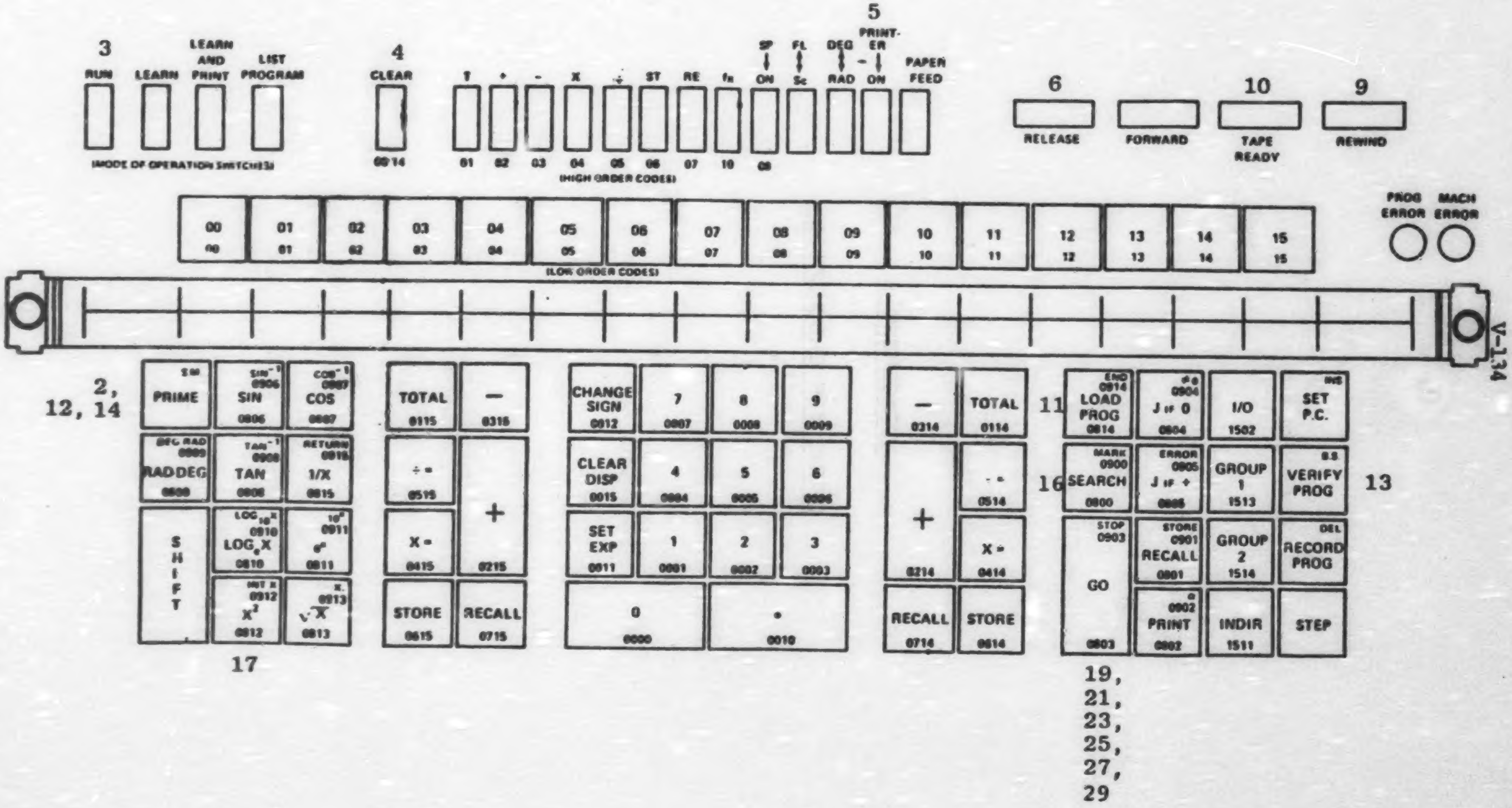
VIII. Print Out Values

Step	Code		Symbol	Key	Comment
0210	07	00	RE0	RE	Recall CCE
0211	08	02	* W	Print	
0212	07	02	RE2	RE	Print CCE with 2 decimal places, label E
0213	07	01	RE1	RE	Recall OC
0214	08	02	* W	Print	
0215	05	02	÷ 2	÷	Print OC with 2 decimal places, label C
0216	07	02	RE2	RE	Recall RI
0217	08	02	* W	Print	
0218	11	04	F4	-	Print RI with 4 places, label I
0219	07	10	RE10	RE	Recall EL
0220	08	02	* W	Print	
0221	14	02	C2	ST	Print EL with 2 places, label L
0222	07	11	RE11	RE	Recall T
0223	08	02	* W	Print	
0224	08	04	* Jo	04	Print T, 4 places, label F
0225	07	13	RE13	RE	Recall DL
0226	08	02	* W	Print	
0227	09	02	* 2	T	Print DL with 2 places, label G
0228	07	03	RE3	RE	Recall CC
0229	08	02	* W	Print	
0230	06	04	ST4	ST	Print CC, 4 places, label D
0231	08	02	* W	Print	
0232	00	15	E15	15	Space
0233	08	02	* W	Print	
0234	00	15	E15	15	Space
0235	07	05	RE5	RE	Recall PVO

Step	Code		Symbol	Key	Comment
0236	08	02	* W	Print	
0237	00	02	E2	02	Print PVO, 2 places, label X
0238	07	07	RE7	RE	Recall PVE
0239	08	02	* W	Print	
0240	01	02	T2	T	Print PVE, 2 places, label Y
0241	07	08	RE8	RE	Recall A
0242	08	02	* W	Print	
0243	02	06	+ 6	+	Print A, 6 places, label Z
0244	08	02	* W	Print	
0245	00	15	E15	15	Space
0246	08	02	* W	Print	
0247	00	15	E15	15	Space
0248	07	09	RE9	RE	Recall CA
0249	08	02	* W	Print	
0250	03	02	-2	-	Print CA, 2 places, label A
0251	09	03	* SP	Stop	Stop
0252	09	14	* EP	End Prog.	Program over

ATTACHMENT B

USING THE CALCULATOR


V-134
3
RUN
LEARN
LEARN AND PRINT
LIST PROGRAM
(MODE OF OPERATION SWITCHES)
4
CLEAR
0014
↑
+
-
X
÷
ST
RE
fn
SP ON
FL Sc
DEG RAD
PRINT-ER ON
PAPER FEED
5
01 02 03 04 05 06 07 10 08
(HIGH ORDER CODES)
6
RELEASE
FORWARD
10
TAPE READY
9
REWIND
PROG ERROR
MACH ERROR
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
(LOW ORDER CODES)
2,
12, 14
PRIME
SIN 0806
COS 0807
RAD DEG 0808
TAN 0808
1/X 0815
SHIFT
LOGeX 0810
e^x 0811
X² 0812
√X 0813
17
TOTAL 0115
— 0315
÷ = 0515
+ 0215
X = 0415
STORE 0615
RECALL 0715
CHANGE SIGN 0012
7 0007
8 0008
9 0009
CLEAR DISP 0015
4 0004
5 0005
6 0006
SET EXP 0011
1 0001
2 0002
3 0003
0 0000
• 0010
— 0214
TOTAL 0114
+ 0214
÷ = 0514
X = 0414
RECALL 0714
STORE 0614
11
16
LOAD PROG 0814
END 0814
J IF 0 0804
I/O 1502
SET P.C.
INS
SEARCH 0800
MARK 0900
J IF + 0805
ERROR 0905
GROUP 1 1513
VERIFY PROG
B.S.
13
GO 0803
STOP 0903
RECALL 0801
STORE 0901
GROUP 2 1514
RECORD PROG
DEL
PRINT 0802
0902
INDIR 1511
STEP
19,
21,
23,
25,
27,
29

STEP	OPERATION
1.	Turn machine ON
2.	Press "PRIME"
3.	Depress "RUN"
4.	Depress "CLEAR"
5.	Turn "PRINTER" on (switch in down position)
6.	Depress "RELEASE"
7.	Place tape in slot (label facing out)
8.	Close tape holder
9.	Press and hold "REWIND" until tape stops
10.	Depress "TAPE READY"
11.	Press "LOAD PROG"
12.	Press "PRIME"
13.	Press "VERIFY PROG". The number 3446 will appear. If the number does not appear, repeat steps 2 - 13.
14.	Press "PRIME"
15.	Enter Equipment Cost, left to right (e.g. 2 5 0 0 is 2500)
16.	Press "SEARCH"
17.	Press "x^2"
18.	Enter Operating Cost, left to right
19.	Press "GO"
20.	Enter Rate of Inflation in decimal left to right (e.g. . 1 0 is 0.10 = 10%)
21.	Press "GO"
22.	Enter Equipment Life left to right
23.	Press "GO"
24.	Enter Tax Rate in decimal left to right

STEP	OPERATION
25.	Press "GO"
26.	Enter Depreciation Life, left to right
27.	Press "GO"
28.	Enter Cost of Capital in decimal left to right
29.	Press "GO"

The input information will be printed out and labeled as follows:

INPUT INFORMATION	SAMPLE OF ACTUAL PRINTOUT	
Cost of Equipment	2500.00	E
Operating Cost	1000.00	C
Rate of Inflation	.1500	I
Expected Life	5.00	L
Tax Rate	.4800	F
Depreciation Life	5.00	G
Cost of Capital	.1200	D

The machine will then skip three lines and print out PVO, PVE and A and label the values as follows:

VALUE	SAMPLE OF ACTUAL PRINTOUT	
PVO	7152.21	X
PVE	4805.42	Y
A	.015719	Z

The machine will again skip three lines and print the civil assessment as shown below:

CIVIL ASSESSMENT	PRINTOUT	
	187.96	A

When you depress the button for "PAPER FEED" (next to "PRINTER") the tape will move up and the record of the calculation may be torn off.

To calculate a second civil penalty, repeat steps 14 to 23.

Turn the printer off by pressing the "PRINTER" switch. Press "RELEASE", remove the tape and close the cassette unit.

COMPANY NAME:

INPUT INFORMATION:

Cost of Equipment $__________ Operating Cost $__________

Rate of Inflation 0. Equipment Life __________ Yrs.

Tax Rate 0. Cost of Capital 0.

Depreciation Life __________ Yrs.

PVO = Net present value of operating costs over assessment period, net of any tax savings arising from operating costs.

PVE = Net present value of equipment cost over entire assessment period. (Includes discounted value of initial and replacement equipment, less the value of tax credits and deductions and of any salvage value at the end of the assessment period.)

A = Amortization factor, giving amount of monthly payment required per dollar of present value to be amortized.

*Civil Assessment = (PVO + PVE) A

OUTPUT INFORMATION: ATTACH CALCULATOR TAPE

PVO __________

PVE __________

A __________

Civil Assessment per month

$__________

*NOTE: See Part III, Chapter I
for an explanation of these
terms and the formula.

APPENDIX A

DEVELOPING COST CURVES TO HELP CALCULATE THE COST OF COMPLIANCE

Over ninety percent of the work of determining the cost of compliance can usually be eliminated if the Department can rely on cost curves that relate readily available information regarding variables such as (a) the nature and concentration of pollutants and (b) the flow of a discharge to the cost of cleaning up that discharge. Such curves can probably be developed that will cover the large majority of cases. There will, in general, be two types of such curves: (1) curves based on the cost of building and operating "model" control facilities that would be able to treat the type and concentration of pollutants and the volume (flow) of discharge involved -- an approach that is typically defined in terms of the type of pollutant and that assumes relatively little process change; and (2) curves based on the actual costs of control experienced either by like sources (e.g. members of an industry) or by sources with similar pollution problems or control technologies. This Appendix outlines how such curves are developed.

CURVES BASED ON MODEL TECHNOLOGIES

To develop a model technology cost curve for a particular class of effluent problems, the Department would (1) define the treatment approach ("model") that would ensure compliance both safely and economically for varying flow rates and concentration levels (2) determine how expensive it would be to buy, install and operate such a system at each of these concentration levels and flow rates and* (3) draw a (set of) curves expressing these relationships. The "model" can range from a simple flow volume regulation to an elaborate system of tanks, pumps, filters, building modification, etc.

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* To develop such costs:

- separate those portions of the control strategy common to all cases and those that apply only to a particular sub-category of cases into separate cost modules;
- itemize the equipment in each module;
- identify the items which vary (in size, quantity, capacity, type, etc.) among individual cases;
- price each module at different size, capacity, etc. levels.

The Department will have to use such curves flexibly. A source may have a whole series of different discharges, in which case calculating the cost of compliance may well mean adding the estimates of several curves, i.e. assuming that several of the model control approaches or cost modules will have to be used. In other cases, cost curves may be available for some problems and not others. Then the staff will have to supplement the curves with slower, more time-consuming methods of estimating costs.

A Prototype Curve

The CEP has developed a prototype set of such curves for treating metal wastes. They vary according to flow volume and pounds of pollutant (a function of flow volume and concentration).* The model distinguishes between sources which require supplemental preliminary treatment for cyanide and/or hexavelent chrome by including pre-treatment facilities as modular add-ons to the basic metals treatment facility. An estimate of the facility cost component of the cost of compliance can be determined easily, after identifying values for the two variables, by using a series of two, three, or four curves and tables.

The basic installed costs for simpler cases (where neither cyanide nor chrome is present) can be calculated from the sum of the values from the neutralization module (I) and the sludge dewatering mechanism (II). The model treatment approach used in developing this curve is explained in greater engineering detail in Appendix B.

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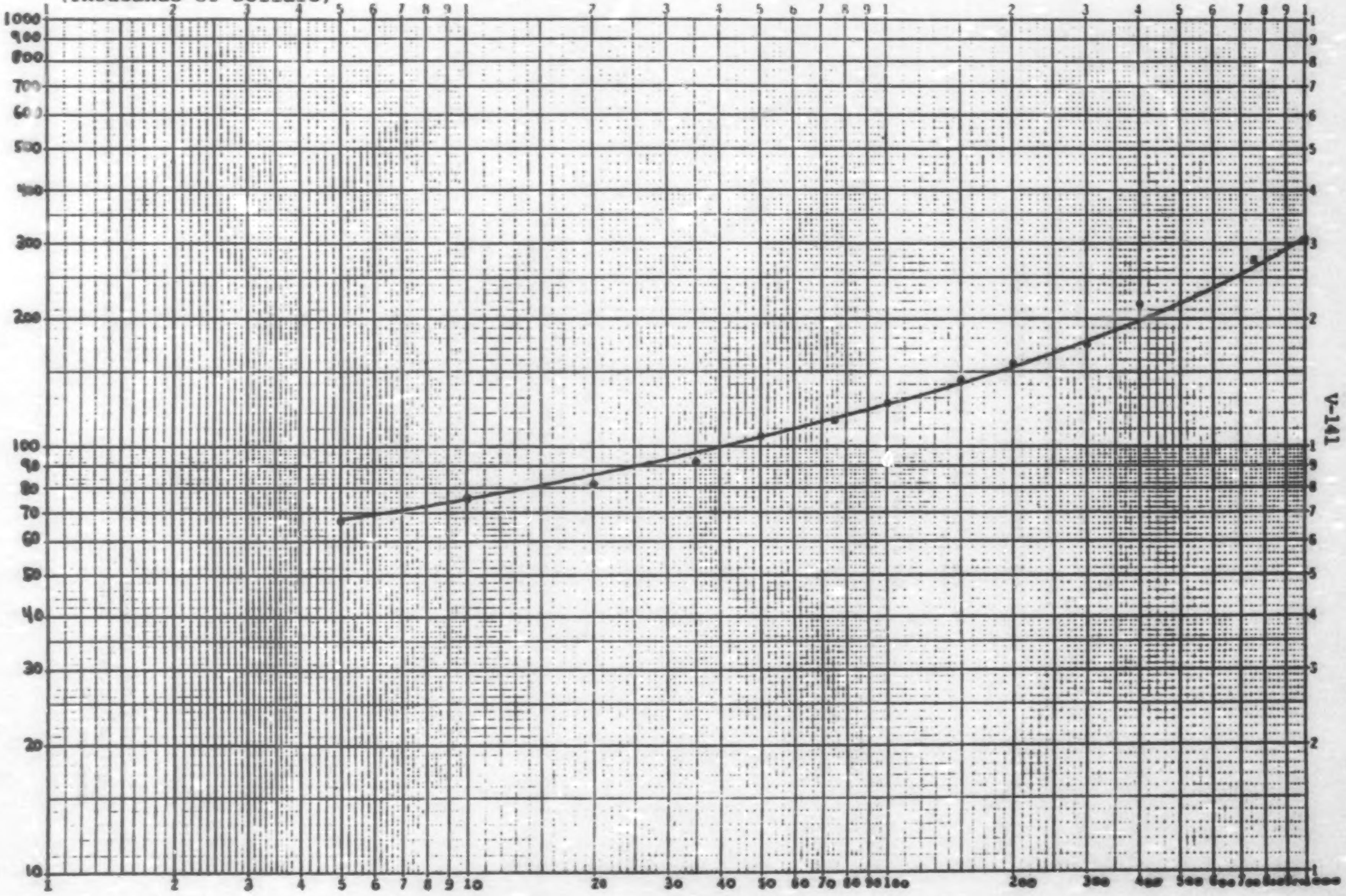
* See File Justification: "The Development of a Model-Based Curve for the Installed Capital Costs of Metal Waste Treatment Facilities." This document may be obtained from the Connecticut State Library, Hartford, Connecticut or from William Drayton, Jr., c/o McKinsey and Company, 245 Park Avenue, New York, N.Y. 10017.

I Neutralization/Settling Module



* Installed Costs = 2.75 X Equipment Costs

II Sludge Dewatering Mechanism

A. Selection of Type

gpm	Land Available	Land Not Available
<15	Sand Drying Bed	Sand Drying Bed*
15-200	Sand Drying Bed	Vacuum Filter
>200	Vacuum Filter	Vacuum Filter

B. Installed Costs of Sludge Dewatering Mechanism

1. Installed Costs For a Sand Drying Bed**

V = flow (gpm)
C = concentration of metals (mg/liter)
N = number of metals in process effluent

Installed Costs = 5.76(V)(C-N)+1375

2. Installed Costs of a Vacuum Filter***

Flow (gpm)	Cost
15-100	82,500
100-500	96,250
More than 500	110,000

* Plants with less than a 15 gpm flow, that do not have sufficient land available for a sludge drying bed, generally make the economic choice to haul the wet sludge rather than install a vacuum filter. The costs for the sand drying bed approximate the incremental future operation and maintenence expenses for hauling wet, rather than dry, sludge.

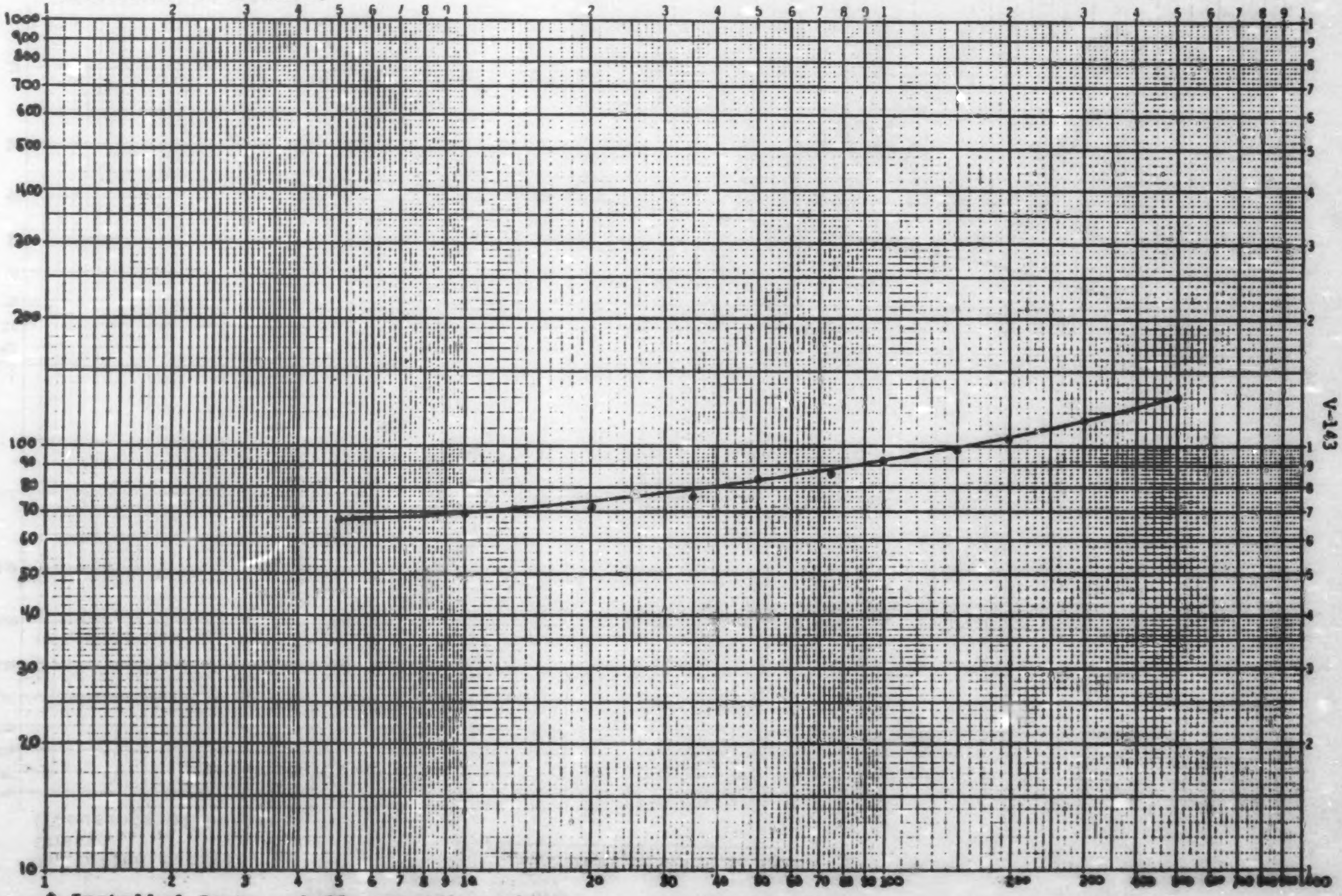
** See File Justification: "Sludge Dewatering Mechanism Cost Formulae." This document may be obtained from the Connecticut State Library, Hartford, Connecticut or from William Drayton, Jr., c/o McKinsey & Co., 245 Park Avenue, New York, N.Y. 10017

*** The installed costs include the costs of a centrifugal pump for the filtrate and an installation add-on equal to 175 percent of the purchased equipment costs.

If cyanide and/or hexavalent chrome are present, the installed capital costs should include appropriate values from curves III and/or IV.

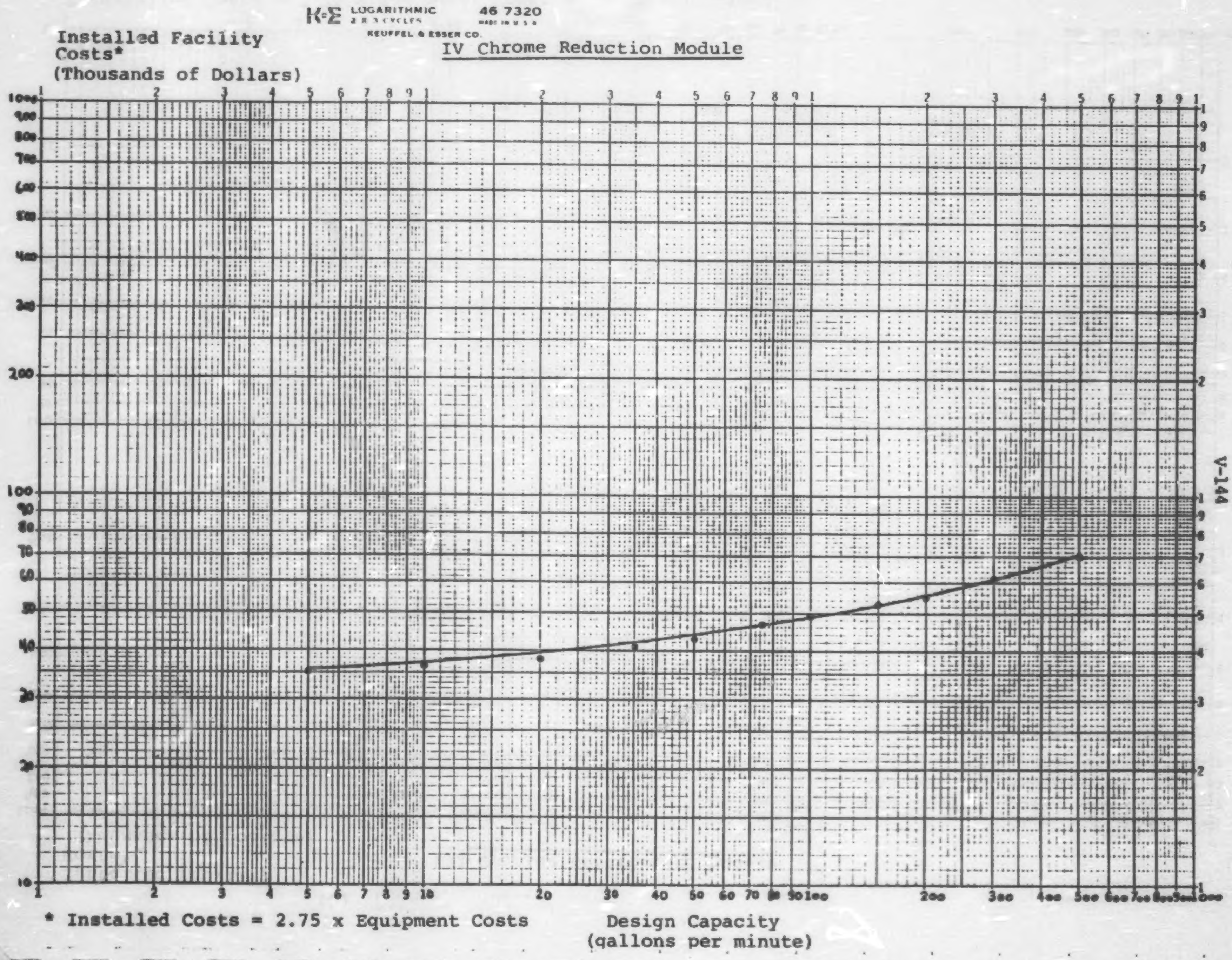
K&E LOGARITHMIC
KEUFFEL & ESSER CO.

III Cyanide Destruction Module



* Installed Costs = 2.75 x Equipment Costs

IV Chrome Reduction Module



* Installed Costs = 2.75 x Equipment Costs

A second set of curves could be developed which treat operating and maintenance expenses as a function of the capital equipment costs, flow and concentration.

Explanation of the Metal Waste Treatment Curves

Metal wastes, such as those from metal plating and finishing processes, generally require a common set of treatment steps: destruction of cyanide and reduction of hexavalent chrome, if these substances are present; neutralization of the acid/alkali solutions and precipitation of the dissolved metals; settling; and sludge dewatering and removal. A limited number of control technologies are generally used to accomplish this treatment. They include batch treatment, continuous flow-through treatment, integrated (closed loop) treatment, reverse osmosis, and ion exchange.

Continuous flow-through (or conventional) treatment was chosen as the technological model for the curves. It is generally adequate for a complete range of flow volumes, though individual plants may find an alternative control strategy more economical or more suited to the particular plant organization and design. Some large manufacturing firms may find reverse osmosis to be more practical, while most plants with very small flows choose the cheaper batch treatment alternative.

Conventional treatment for metal wastes includes neutralizing the acid/alkali solution and precipitating the dissolved metals, settling the precipitate, and removing the sludge. The presence of cyanide and/or hexavalent chrome requires treatment prior to neutralization: cyanide must be destroyed due to its harmful qualities and hexavalent chrome must be reduced to trivalent chrome before it will precipitate. Thus the technological model consists of the basic neutralization and sludge dewatering modules common to all dissolved metals treatment facilities and two add-on modules for pretreating cyanide or chrome.

The capital cost items required for a continuous flow-through system include holding and treatment tanks, a clarifier/settling basin, sludge dewatering mechanism, pumps, mixers, chemical storage tanks, controls, installation materials and additional buildings. The model includes the items generally required to ensure adequate treatment for the broad category of metal wastes. Individual installations may include fewer items -- e.g. if manual rather than automatic procedures are adopted for some of the treatment steps. Building needs, which defy generalization, were excluded from the model. For the purpose of determining the cost of compliance, these costs may be estimated using a consultant's per-square-foot building cost factor as discussed above.

An analysis of the individual equipment items indicates that flow volume is the major source of cost variation. The size, quantity, capacity, and/or type of the equipment items vary chiefly in relation to flow. Since costs vary in relation to these specifications, differences in cost are largely functions of flow volume. The type and cost of the sludge dewatering mechanisms adopted for particular installations depends on the availability of land and the concentration of metals in the untreated discharge as well as the volume of flow.

In order to determine the cost variation for the model at different design flow capacities, the specific size, quantity, capacity, and/or type of each component was determined for each of several flow volumes from 5 to 1,000 gallons per minute (gpm). The type and size of the sludge dewatering device for different installations was related to two factors -- availability of land and sludge production (a function of flow volume and concentration).

To determine the facility costs for the model with different flow and sludge capacities, the following procedure was followed:

(1) the current prices for each of the equipment items and instruments as specified for the different flow and sludge capacities were obtained from suppliers, manufacturers, and consultants;

(2) for each flow volume, the sum of the costs for all the items (except the sludge dewatering mechanism), as specified for a given design flow-capacity, was calculated;

(3) the costs of installation materials (including piping, electrical wiring and paint), contractors' overhead and profit, and engineering fees were taken into account by inflating equipment costs by 175 percent, consistent with the estimating procedures of chemical engineers;

(4) the sludge dewatering cost criteria and formulae were determined.

The costs of the basic cyanide, chrome, and neutralization/settling treatment modules have been plotted against flow volumes. The costs of a sludge dewatering mechanism can be determined from a series of formulae and tables. The sum of the costs calculated from the curves and tables for each of the treatment modules required for a particular metal waste discharge represent the facility costs of a control/treatment technology considered adequate by the Department for a case with the particular flow volume, concentration, and land availability characteristics.

Evaluation of Curves Based On Technological Models

The actual costs in many individual assessment cases should be substantially lower than the costs given by the curves, since the values for flow in the model reflect flows before the actual treatment system is designed. Consulting engineers hired to design treatment systems are usually able to lower costs by recommending process changes in the discharger's plant. Flows can be reduced with devices such as counter current rinses, spray valves, etc., thereby cutting the size and costs of tanks and pumps.

Consulting engineers also recommend other treatment cost saving measures, such as reorganizing production lines, eliminating marginal lines and substituting non-cyanide rinses in the process for cyanide-rinses which require special treatment. Also, another treatment approach, e.g. batch treatment, reverse osmosis, may be more economical. And in many cases, savings may be possible by using in-house labor or unused equipment. Finally, in some cases a treatment facility may already exist for which modifications, rather than replacement, will achieve the effluent reduction required by the Department. In all these cases the Department may still rely on the model-based curves and tables for rough estimates of the facility cost component of the cost of compliance. It will, however, probably have to lower the assessment later when actual cost information is available.

A second set of curves may be developed to help estimate operation and maintenance costs. The annual expenses may be divided into two groups. Chemical and sludge disposal costs depend on the amount of metal to be treated, a function of flow and concentration. Labor, electricity, repair, and other operation and maintenance costs may be estimated using a percentage of the installed equipment costs -- a factor commonly used by consulting engineers. Thus, using the same information required for using the installed capital cost curves (flow volume and concentration) and information about the installed capital costs (actual or estimated) the operation and maintenance component of the cost of compliance can be determined easily and quickly. Again, if the rough initial estimate is high, it can be corrected upon submission of documentary evidence of actual costs.

CURVES BASED ON ACTUAL COSTS

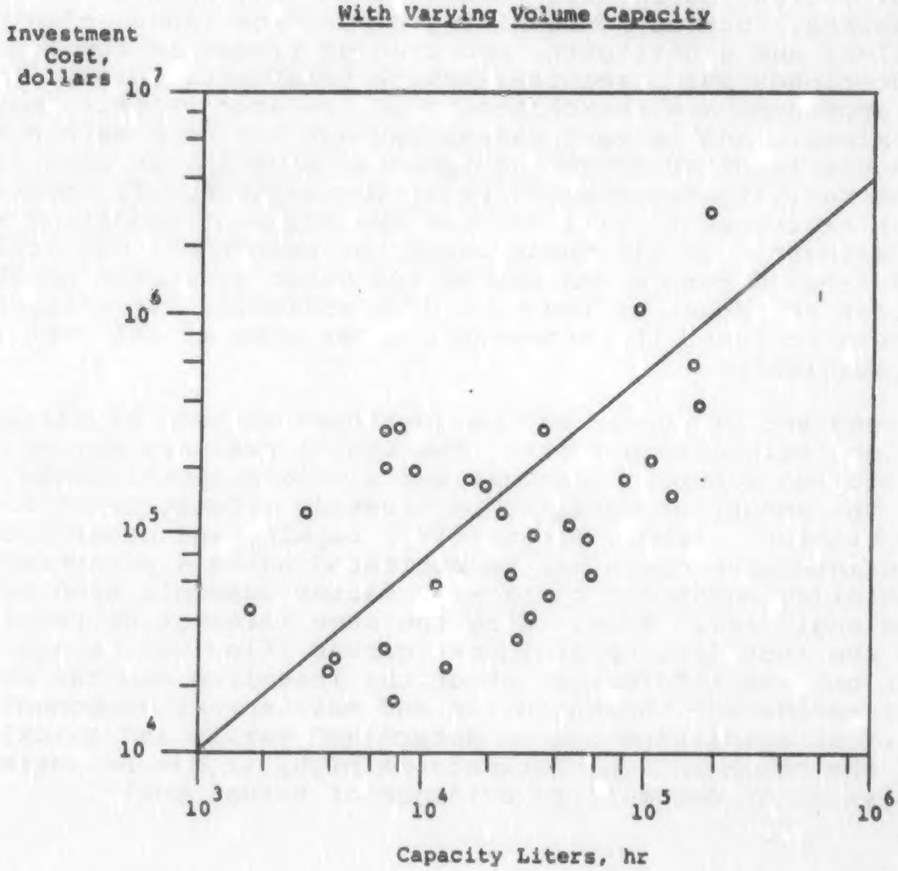
A second type of curve may be developed for those categories of pollution control problems or types of technology for which a functional relationship can be defined between the actual costs for completed facilities and some variable characteristics of the individual sources or discharges. For most types of pollution problems, the costs of an adequate control technology vary generally in relation to flow volume. But for a particular type of problem, there may be more significant determinants of case-to-case cost variation. If a statistically sufficient number of cases with adequate cost records is available, and if key cost parameters can be identified, a curve can be drawn.

AN EXAMPLE

Such a curve was plotted by EPA for the metal finishing industry.*

Investment Costs of Waste Treatment Plants

With Varying Volume Capacity



The points on the curve represent the investment costs typically incurred to install a waste treatment facility. The costs do not reflect any one type of treatment technology or percent effluent reduction. Rather the costs cover work done to accomplish acceptable treatment of the discharges of a variety of individual plants in the broad category of the metal finishing industry.

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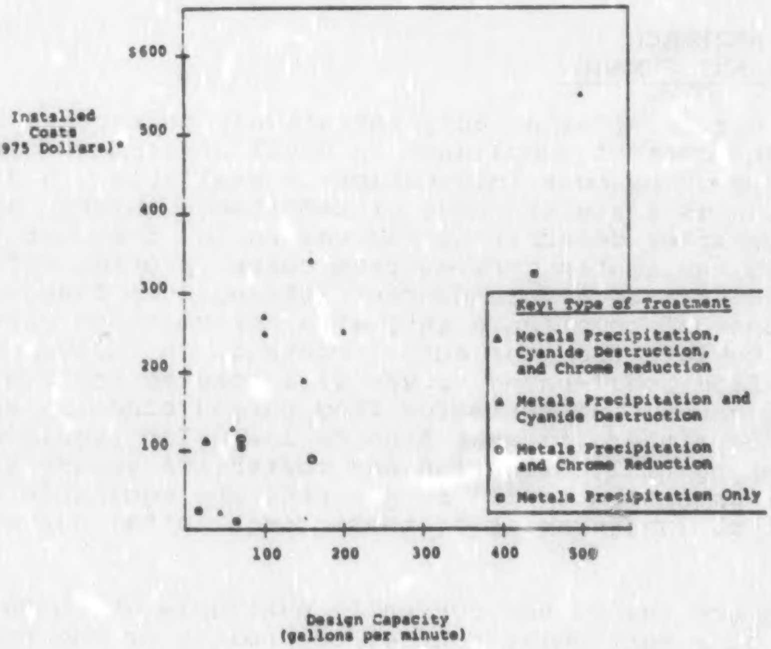
* EPA - 440/1-75/040-a, "Development Document...for the Metal Finishing Segment of the Electroplating Point Source Category," p. 143, (1975).

It may be possible to plot more accurate curves that relate actual costs to volume capacity of the treatment system for defined subsets of the metal finishing industry or of the several available waste treatment technologies. For instance, the costs of four types of metal finishing waste treatment plants -- those with facilities for handling both cyanide and hexavalent chrome wastes, cyanide only, hexavalent chrome only, or neither -- may be plotted separately. Actual cost data for metal waste treatment facilities in Connecticut indicate that the installed costs and the annual operating and maintenance expenses are in fact higher for industries which generate wastes containing both cyanide and hexavalent chrome than those which generate either one alone or neither. Although sufficient information has not been gathered to establish a curve for any one of the four metal waste treatment subcategories, this relationship is evident from the data points plotted below.*

The Installed Costs of Metal Waste

Treatment Facilities in Connecticut



Source: Survey of Metal Waste Treatment Facilities in Connecticut

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* Installed Costs were updated to mid-1975 using the *Chemical Engineering* Plant Cost Index annual averages.

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* See File Justification: Actual Costs for Metal Waste Treatment Facilities in Connecticut. Available from the Connecticut State Library, Hartford, Connecticut or from William Drayton, Jr. c/o McKinsey & Co., 245 Park Avenue, New York, N.Y. 10017.

When a statistically valid sample is available for any one of the treatment categories, a curve may be drawn that will more closely approximate the costs for individual cases in the particular treatment category than does the industry-wide EPA curve which generalizes the costs for all four subcategories.

Evaluation of "Actual" Cost Curves

The costs in an individual case may be more or less than the average amount given by the curves for roughly similar cases. To hedge against the possibility of underestimation, the Department may add on a correction factor to the curve-generated estimate of the cost of compliance but not collect the increase in the assessment due to this adjustment when imposing liability. If submitted vouchers or other documentation show that the actual costs are less in a particular case, the assessment can be lowered to the appropriate amount.

THE CURVE APPROACH -- EVALUATION AND SUMMARY

Cost curves offer an administratively attractive way to estimate the cost of compliance in civil assessment cases in which little or no cost information is available. A department engineer can estimate the cost of compliance quickly and easily from curves after determining the values for the cost variables. In addition, estimates derived from curves provide effective limits on discretionary assessment setting. As discussed earlier, cost of compliance estimates derived from curves are likely to deviate from the actual costs in an individual case: estimates from model-based curves will tend to be high for individual cases, and estimates from curves based on actual costs may be either somewhat high or low. The regulatory provisions for partial collection and correction ensure that individual assessments will be accurate and equitable despite the potential inaccuracies of these rough inital curve-based estimates.

There are few curves currently available which generalize the costs of a particular control technology or the costs of controlling a particular class of pollution problems.* Curves from various economic impact analyses by EPA, independent research firms, trade and industry associations and others do, however, provide a useful but limited beginning. Although the number of curves currently available and usable for cost of compliance estimating is small, additional curves may be developed for control technologies for which costs can be generalized in relation to some variable characteristic(s) of individual sources or discharges and for which the number of key determinants of case-to-case cost variation is limited. The prototype curves which relate the installed capital costs of metal waste treatment technology to the volume of flow, the amount of sludge protection, and the availability of land for sludge drying beds demonstrate the rationale and methodology for developing curves based on models of specific control technologies.

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* Recent cost studies by EPA and its research contractors have examined costs using both models and costs in actual cases. Numerous types of waste treatment facilities have been modeled in order to evaluate the costs of the specific control technologies required to achieve varying degrees of effluent limitation. For some industries, such as the metal finishing and paint and ink formulating industries, treatment facilities were modeled for several different size process plants, but in most cases, just one average size model was used to weigh the costs of the alternative control technologies. Actual cost data was gathered for the purpose of analyzing the economic impact of prescribed levels of effluent reduction. For some industries, such as the metal finishing and common and precious metals subcategories of the electroplating point source category, sufficient cost data were available to plot a curve relating either investment costs or annual treatment costs to a significant discharge variable. However, since the data were collected in order to determine the probable economic impact of expenditures for the incremental control facilities required for a particular effluent limitation, they might include cases in which minimal modifications were necessary as well as cases in which entire new facilities were installed. In addition, the final level of effluent reduction in individual cases might vary substantially as long as the minimum level prescribed was achieved. As a result, the majority of curves based on actual cost data represents the average incremental costs experienced by the group in order to meet a specific standard rather than the costs of a particular type of installation or technology.

The Department can review the various types of pollution problems and pollutants to determine which categories lend themselves to a general control model and cost analysis. For some categories of pollution problems, such as subsurface sanitary waste disposal or metal waste treatment, there is one type of control technology which is adequate to meet Department requirements for virtually all sources. For these types of problems, a model of the control technology can be developed and costed for different values of the key parameters. However, some other classes of pollution control cases, such as siltation and run-off control, may be so idiosyncratic as to defy generalization and preclude development of cost curves.

Costs can probably be generalized and developed to cover a substantial portion of pollution control cases which come under order or require permits. The prototype curve for treatment of metal wastes covers approximately one-third of all non-municipal orders issued in a recent one-year period. Curves may be developed which give the costs of treating dairy wastes and disposing of sanitary sewage, problems which respectively account for one-quarter and one-fifth of orders. The remainder of the orders, approximately half of the total,required treatment for miscellaneous industrial waste problems or control measures for presumably idiosyncratic siltation, run-off and other types of pollution problems.* Several of the industrial waste cases may require control technologies of the sort which lend themselves to generalized models and cost analyses.

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* Analysis of 70 non-municipal orders issued from April, 1974 to March, 1975.

APPENDIX B

THE COST CURVE

TREATMENT APPROACH*

This appendix describes in detail the treatment system used as the basis for the prototype cost curve described in Appendix A. This treatment system is a typical flow-through arrangement with all cyanide, chrome and acid/alkali wastes being segregated. Gravity flows are assumed within treatment modules -- that is, for example, from first stage cyanide to second stage cyanide; and also from one treatment module to the next -- that is, from cyanide destruction to neutralization. Generous equalization is provided prior to cyanide destruction, chrome reduction and neutralization. It is assumed that all organic cleaners and any other solutions containing high amounts of organics are discharged to the sanitary sewer; however, the rinses from these solutions are allowed to be discharged to the metal finishing waste treatment system. Cyanide destruction is performed by typical two-stage alkaline chlorination and chrome reduction is performed by typical one-stage acid sulfonation.

CYANIDE DESTRUCTION

Cyanide wastes are contributed by three sources: (1) dilute rinses from cyanide plating solutions and cyanide dips; (2) floor spillage from cyanide processing areas; and (3) dumps of concentrated solutions flowing by gravity to a concentrate holding tank. This holding tank is equipped with one high level control with audible alarm. All floor spillage is segregated by diking, and is directed to sumps from which it is pumped to a floor spillage collection tank. This tank is also equipped with one high level control with audible alarm. The contents of both the concentrate holding tank and the floor spill collection tank are pumped to a cyanide pretreatment tank. In this tank all cyanide from the first two sources is destroyed prior to the solution's discharge to the neutralization system. All chemical additions are manual,therefore, no pH or ORP recorders or controllers will be needed. A portable mixer provides good mixing during batch treatment.

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* The work reported in this Appendix was done by Michael Harder, a member of the Water Compliance Unit's Engineering Staff.

It is assumed that all dilute rinses will flow by gravity to the cyanide equalization tank, which is sized for a 30-minute retention time to allow good equalization and provided with one high/low level control and one mixer. The level control is designed to keep the volume of contained liquids between a minimum and a maximum. This high/low level control controls the discharge pump from the equalization tank to the first stage cyanide treatment tank. For the cyanide destruction liquid sodium hypochlorite is used rather than gaseous chlorine because of the smaller space requirements for the liquid hypochlorite and the greater ease of dissolution as compared with the chlorine gas.

The first stage treatment tank is sized to provide 15 minutes retention time. A pH recorder controller keeps the pH in this tank at approximately 11.0. If the pH falls below the set point, the controller will automatically call for the addition of liquid sodium hydroxide which is fed in by means of a metering feed pump. The addition of the liquid hypochlorite is controlled by an ORP recorder-controller. These treatment indicators are detected by means of a pH probe and ORP probe. These probes are connected to the pH and ORP recorder-controllers. The contents of this tank are mixed to allow complete first stage reaction.

Once the cyanide has been partially destroyed to cyanate, the wastes flow by gravity to the second stage cyanide treatment tank. This tank is sized to provide 45 minutes retention time. The pH of this reaction is maintained at approximately 8.5 by the addition of dilute sulfuric acid. The cyanate in this tank is completely destroyed to carbon dioxide and nitrogen, again by means of liquid sodium hypochlorite. As in the first stage, the reaction is controlled by pH and ORP recorder-controllers and probes. The only exception is that in the second stage treatment, the pH recorder-controller controls the addition of dilute sulfuric acid, whereas in the first stage treatment the pH controller controls the addition of liquid sodium hydroxide. Again, the contents of the tank are thoroughly mixed. The pretreated wastes now flow by gravity to the neutralization system.

CHROME REDUCTION

Chrome wastes are contributed in the same manner as the cyanide wastes, that is from dilute rinses, floor spills and concentrated dumps. All concentrated dumps flow to a concentrate holding tank which is equipped with one high level control with audible alarm. The contents of the tank are then batch treated manually to reduce the chrome, using the same chemicals as are used for treating the dilute rinses below. A mixer is provided to insure proper mixing of the contents of the tank during the reaction. Progress of the reaction is monitored by means of portable test kits. When the reaction is complete the contents of the tank are bled to the neutralization system by means of a portable metering pump. All floor spills are directed to the acid/alkali floor spill collection tank and treated as described below.

All chrome-bearing dilute rinses flow by gravity to the chrome equalization tank. This tank is equipped with a high/low level control and a mixer and sized for a 30-minute retention time. The level control controls a pump in the same manner as the cyanide equalization level control. The equalized chrome rinses are pumped to the chrome reduction tank which is sized for a 15-minute rention time. This tank is equipped with a mixer, pH probe and recorder-controller, and ORP probe and recorder-controller. The pH controller maintains the pH of the reaction from 2.5 to 3 by means of dilute sulfuric acid. The acid is fed in by a positive-displacement, diaphram-type pump which is activated by the pH recorder-controller. The chrome is reduced by sodium metabisulfite which is added by a positive-displacement diaphragm-type pump, controlled by the ORP recorder-controller. The metabisulfite is contained in a storage tank with a mixer. Sodium metabisulfite was chosen over sulfur dioxide gas for chrome reduction because this chemical requires relatively little storage space and because it dissolves easily. The pretreated chrome wastes now flow by gravity to the equalization tank prior to neutralization.

NEUTRALIZATION.

As in the previous two cases, waste can originate in this category from three sources: dilute rinses, floor spills, and concentrated dumps. Dumps of spent acid or alkaline solutions flow to the concentrate holding tank, with the exception of spent organic cleaners which are discharged to the sanitary sewer. The concentrate holding tank is equipped with a high level control with audible alarm and a mixer. When the high level alarm sounds, the contents of the tank are pumped at a slow rate to the equalization tank. All acid/alkali from chrome floor spills are directed to the acid/alkali floor spill collection tank by a sump pump located in the processing area. The floor spill collection tank has a mixer and a high level control. When the alarm is activated,the contents of the tank must first be pretreated for chrome prior to discharge to the equalization tank for neutralization. This pretreatment for chrome is performed in the same manner as that for the dumps of concentrated chrome solutions.

In Summary, five flows enter the equalization tank prior to neutralization: first, bleeding of the spent acid/alkali concentrates from the concentrate holding tank; second, bleeding from the pretreated acid/alkali floor spill collection tank; third, the pretreated dilute rinses containing cyanide; fourth, the pretreated dilute rinses containing chrome and last, the dilute acid/alkali rinses. This equalization tank is provided with a mixer and a high/low level control and is sized for a 30-minute retention time. The contents of the equalization tank are then pumped to the neutralization tank which is sized for a 15-minute retention time. It is equipped with a mixer, pH probe and recorder-controller. The pH controller maintains the pH in the optimum range for metals precipitation by adding either sodium hydroxide or sulfuric acid. The chemicals are added by a positive-displacement diaphragm-type pump which is activated by a pH controller. The neutralized wastes now flow by gravity to the flocculant addition tank which is sized for a 5-minute retention time. The flocculant aid is added at a pre-set rate. There are no controls in this step other than this manual setting. The flocculant aid is held in a storage tank which is provided with a mixer. The wastes are next pumped to the clarifier or settling basin.

SOLIDS REMOVAL AND SLUDGE HANDLING

The neutralized and precipitated wastes, containing large amounts of suspended metal hydroxide sludge, enter the clarifier. This clarifier is designed for a two to three hour retention time; however, a more important design parameter is the surface overflow rate which will not exceed 300 gallons per square foot per day, or 0.208 gallons per minute per square foot. It is assumed that some type of prefabricated clarifier will be used rather than an in-ground settling lagoon, since in all cases the clarifier would be more expensive. The clear supernatant flows over the effluent weir leaving behind the concentrated sludge in the bottom of the settling tank. The sludge is collected at a central point in the settling tank and is pumped to a sludge holding tank. It is further assumed that in this holding tank the sludge is compacted twofold; that is, it becomes a two percent by weight slurry. Any supernatant from this tank is pumped back to the neutralization tank.

Two percent sludge slurry is then pumped to the solids dewatering mechanism, either a vacuum filter or a sand drying bed, depending on whether adequate land is available for the latter. If a vacuum filter is used or if underdrains are used with the sand drying beds, then the sludge filtrate will be pumped back to the neutralization tank. However, in the case of the vacuum filter, it is assumed that the filtrate pump and conveyor are provided and that the vacuum filter is of the non-precoat type. In addition to the availability of land, the following cut-off points are assumed in choosing between the vacuum filter and the sludge drying bed: less than 15 gallons per minute, always assume a sludge drying bed will be used; above 200 gallons per minute, always assume a vacuum filter will be used. If the vacuum filter is used, the following ranges are assumed: 15 gallons per minute to 100 gallons per minute, use a 3 foot diameter by 3 foot vacuum filter; 100 gallons per minute to 500 gallons per minute, use a 4 foot diameter by a 6 foot wide vacuum filter; and above 500 gallons per minute, use a 6 foot diameter by a 6 foot wide vacuum filter. These ranges are simply educated guesses made necessary by the wide range in operating procedures and characteristics of industries employing vacuum filters.

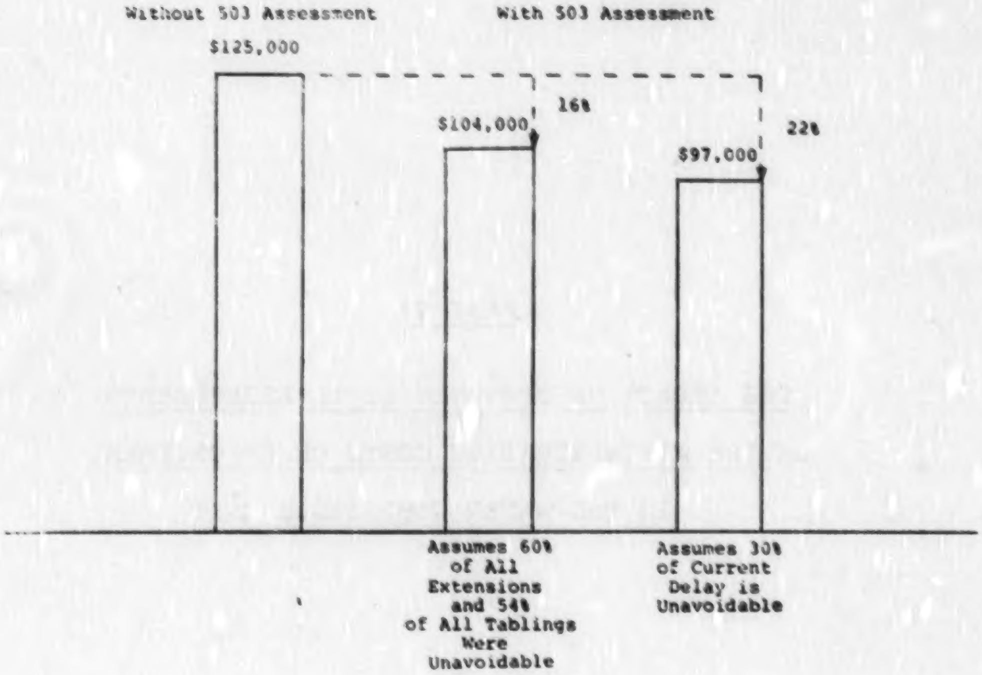
PART VI

THE IMPACT OF ECONOMIC CIVIL ASSESSMENTS ON THE ADMINISTRATIVE COSTS OF ENFORCEMENT IN THE WATER COMPLIANCE UNIT

ECONOMIC CIVIL ASSESSMENTS WILL CUT THE COST OF HANDLING THE CURRENT WATER COMPLIANCE UNIT'S ENFORCEMENT COSTS ROUGHLY 20 PERCENT - $25,000 A YEAR.

Annual Administrative Costs for Enforcement

(Current Caseload - Costs Per Year)



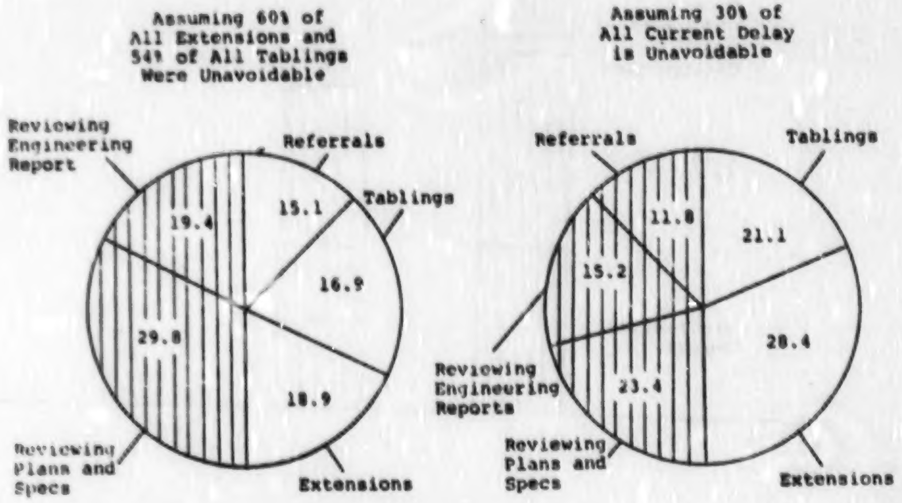
DISCUSSION: CEP's study of what has happened to voluntary compliance in other regulatory areas when enforcement has been strengthened, indicates that tightening Water Compliance's enforcement grip with tools like the 503 Assessment will lead to fewer cases of delayed compliance and less resistance to Department action when delay does occur. This improvement will not, however, occur immediately. How long it will take regulatees to become aware of and respond to this change in their situation will depend on (1) what efforts the Department makes to inform them of the existence and effectiveness of its new enforcement tools, and (2) how quickly it begins to use these tools.

For the average case, these savings are $140 if roughly 60 percent of all delay now experienced is unavoidable, $175 if 30 percent of the dealy could not be avoided.

MOST SAVINGS COME FROM:

- **HAVING TO PROCESS FEWER EXTENSIONS, TABLINGS AND REFERRALS**
- **HAVING TO REVIEW FEWER (AND SOMEWHAT BETTER PREPARED) ENGINEERING REPORTS AND PLANS AND SPECS.**

Percent of Total Savings



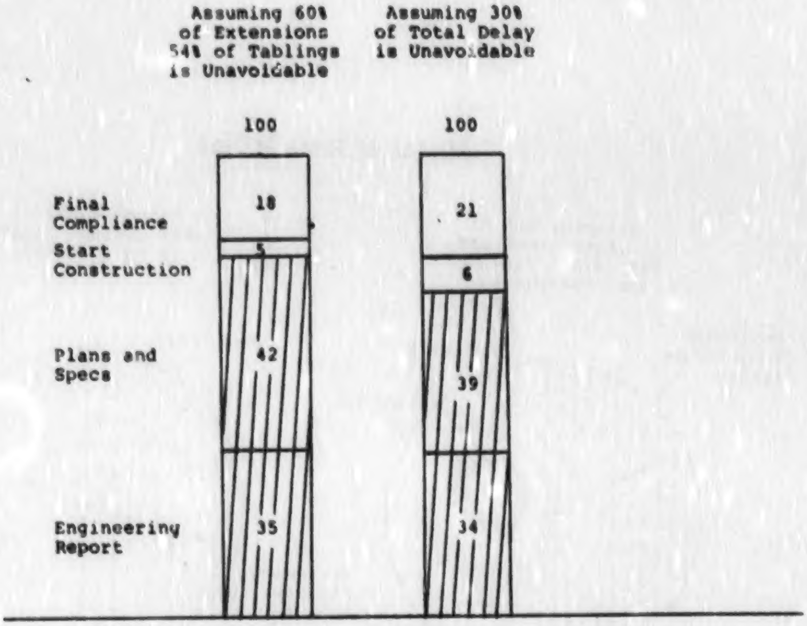
Assuming 60% of All Extensions and 54% of All Tablings Were Unavoidable

Assuming 30% of All Current Delay is Unavoidable

THREE QUARTERS OF THE SAVINGS COME DURING THE INITIAL PLANNING STEPS.

Percent of Total Savings

by Step of Order



DISCUSSION: These first two steps in most cases are also where three quarters of all delay now occurs.

THESE SAVINGS ARE NET OF THE ADDED COSTS OF CIVIL ASSESSMENTS.

- It will cost $295 on average to impose and administer a civil assessment when this proves necessary.

- Roughly 40 percent of this cost is incurred before a Notice of Violation is issued - following up problems once they are detected, deciding an assessment is necessary, estimating the costs of compliance, calculating the assessment, and issuing the notice.

- Another 30 percent is the result of possible hearings - 22 percent from possible hearings regarding the assessment and 7 percent from later correction hearings. (If hearings are requested in 20 percent of all civil assessment cases and held in only 10 percent, the cost of the average assessment case would drop 13 percent to $256. The $295 figure assumes 30 percent of the cases request hearings, and that hearings are held 20 percent of the time.)

- These calculations also take into account an assumed 200 percent increase in hearings regarding orders - back to the level experienced just after the Department began issuing abatement orders - because regulatees will probably be more reluctant to accept orders once they know that noncompliance may prove expensive. Section 502 provides the Department with an important means of discouraging such delay-motivated hearings.

Back-up Data

THE ADMINISTRATIVE COSTS OF ENFORCING COMPLIANCE

(Before CEP Tools Introduced; The Average Case)

Enforcement Steps With Normal Chronology Reversed	Percent of All Orders Where Step Applies	Number of Times Step Used In Orders Using It At All	Average Cost of Step When Used	Cost in the Average Case
Refer	11	1.0	83.00	9.13
Table	34	1.1	70.00	23.86
Extend	43	1.5	84.00	36.12
Inspect/Verify Compliance	98		30.00	29.40
Receive Notification of Compliance	98		1.00	.98
Refer	2.7	1.0	83.00	2.24
Table	8	1.0	64.00	5.12
Extend	14	1.5	84.00	11.76
Inspect/Request Evidence	10		12.00	1.20
Receive Start Construction Report	78		2.00	1.56
3rd P&S Review	20		35.00	7.00
2nd P&S Review	72		60.00	43.20
1st P&S Review	80		150.00	120.00
Refer	3.7	1.0	83.00	3.07
Table	26	1.3	83.00	21.58
Extend	22	2.4	134.00	29.48
Receive Plans & Spec.	80		2.00	1.60
3rd ER Review	15		35.00	5.25
2nd ER Review	54		60.00	32.40
1st ER Review	60		115.00	69.00
Refer	9	1.0	83.00	7.22
Table	39	1.0	64.00	24.96
Extend	39	1.2	67.00	26.13
Receive Engr. Report	60		2.00	1.20
Receive Report re: Hire Engr.	5		2.00	.10
Respond to Enquiries	50		15.40	7.70
Hearing	1.25		350.00	4.37
Receive Request for Hearing	5		25.00	1.25
Issue Order	100		46.00	46.00
Detection	100		119.00	119.00
			TOTAL	691.88

Sources: Extensive interviews with Water Compliance staff; review of random sample of case files; CEP flow diagram of steps; and simulations. The underlying data has been reviewed by Water Compliance staff.

BIBLIOGRAPHIC DATA SHEET

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